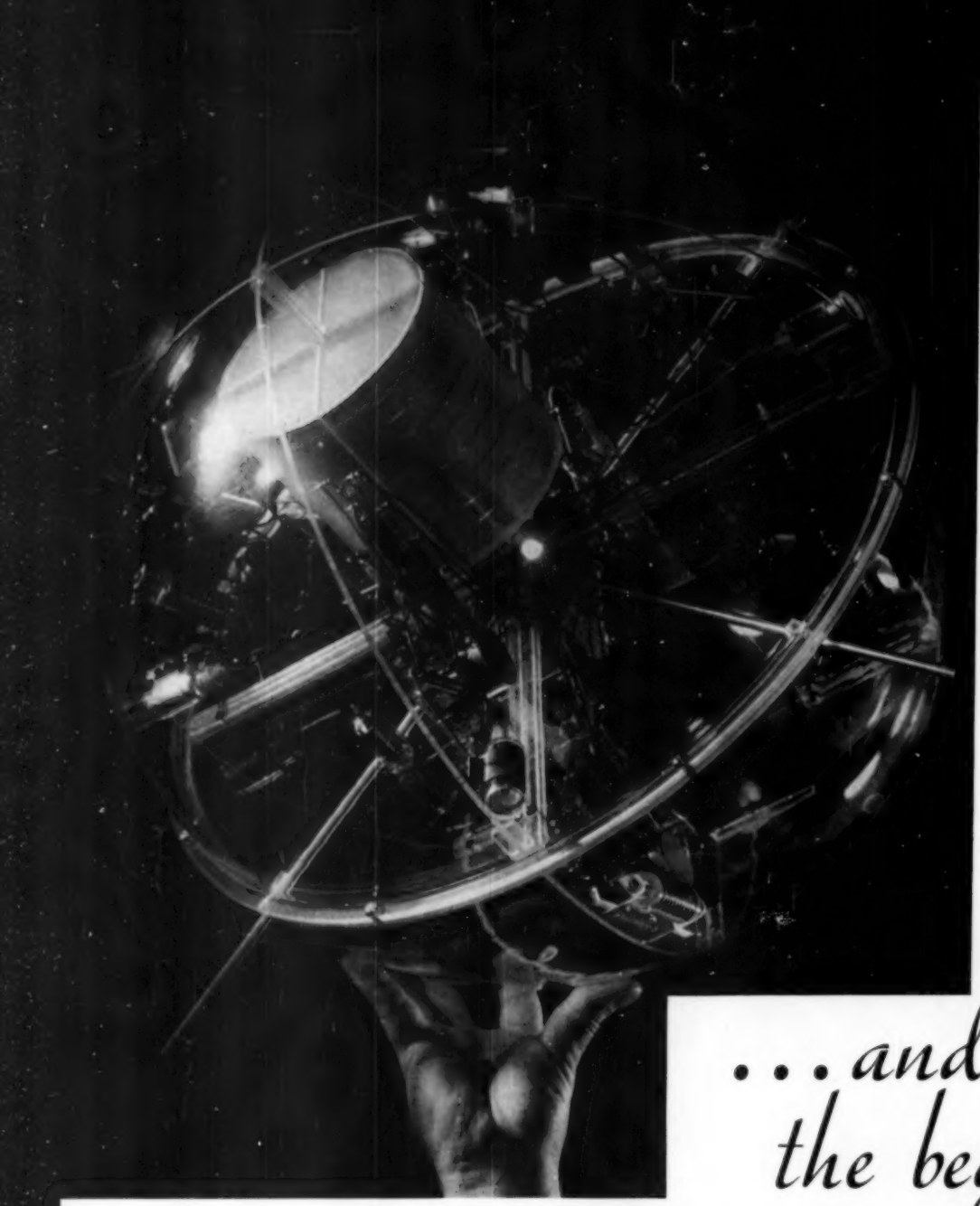
January, 1957 Vol. 46 No. 1

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

Season's Greetings



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POPULAR SCIENCE MONTHLY

. . . and it's only the beginning

DURING the International Geophysical Year the United States will launch the first man-made moonlet. This first satellite will spin about the earth once every hour and a half in an elliptical orbit passing within 200 miles of the earth's crust at the nearest point and soaring 800 miles from the earth at its farthest point. Physically, the satellite will be spherical in shape measuring 30" in diameter and weighing 21.5 pounds. Packed with precision instruments, this first moonlet will be man's pilotless pioneer in the wilderness of outer space. And this is only the beginning. Surely more satellites will follow the first and finally man's first flight into space. But in the annals of history the first moonlet will take its rightful place . . . the beginning from which all else was born.

Man's first satellite is to the conquest of space as the foundation is to any structure or as a lad's education is to his adulthood. To the instructor of mechanical drawing, he sees his students standing on the threshold of an engineering career. With tireless energy he imparts to the student the love of fine work, a devotion to skilled craftsmanship, and habits of creative thinking and sound judgment. It is axiomatic that drawing instruments are basic tools of the engineering profession. Here worthy instructors insist each student obtain the finest drawing set the student can afford. Shoddy, cheap drawing tools in the hands of the student are certain to stain his respect for his chosen profession. Precision drawing instruments are a lifetime possession . . . precision will inspire precision.

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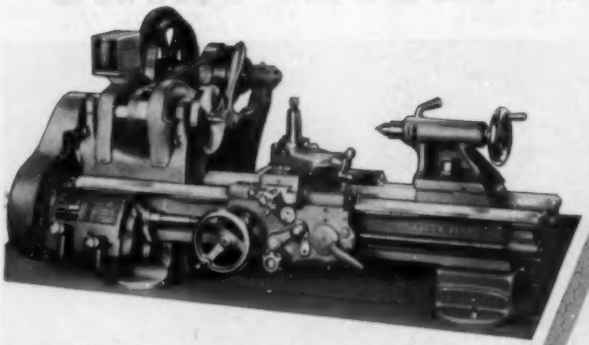

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—12-speed drive, less electrical equipment, f.o.b. factory—$444. Other 9" Lathes from $266.

Light Ten Model A Precision Floor Lathe

—metal column base, underneath motor drive, less electrical equipment, f.o.b. factory—$854. Other Light Ten Lathes from $369.

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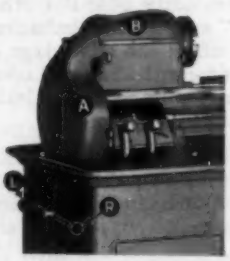

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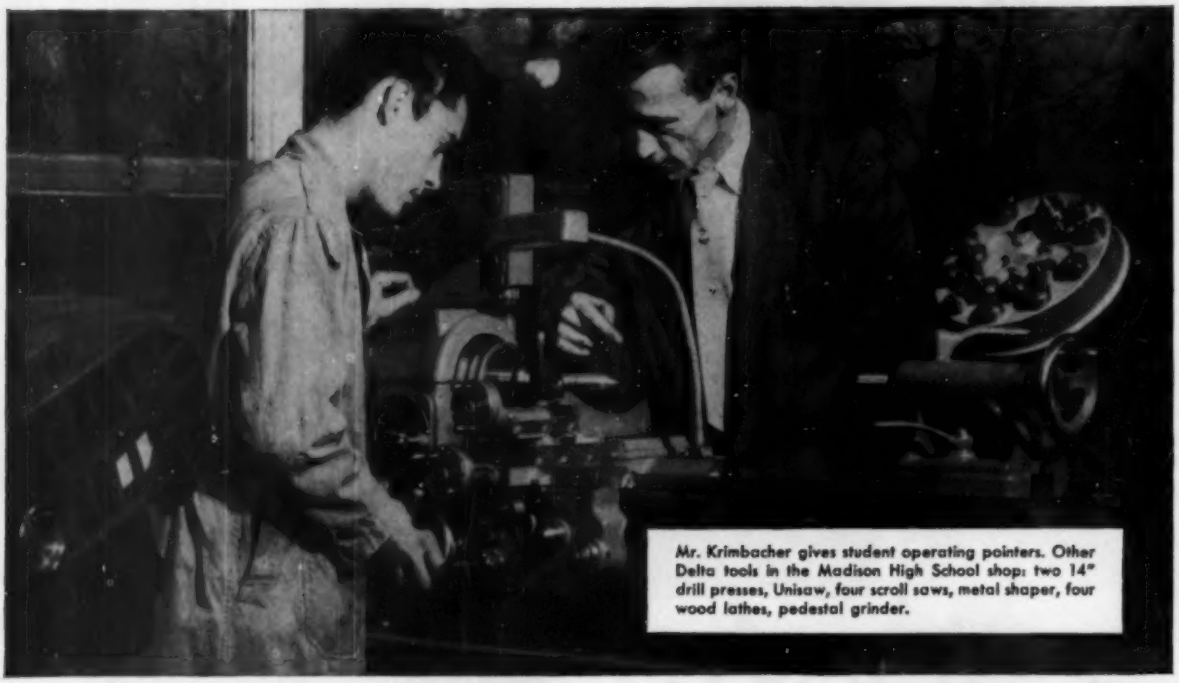

Mr. Krimbacher gives student operating pointers. Other Delta tools in the Madison High School shop: two 14" drill presses, Unisaw, four scroll saws, metal shaper, four wood lathes, pedestal grinder.

"... *the* ideal lathe for school shops,"

says Frank Krimbacher, Dir. of Ind. Arts, Madison H. S., Royal Oak, Mich.

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JANUARY
1957

VOL. 46 NO. 1

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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☆ ☆ ☆

This Month's Cover

Cutting and polishing of semiprecious stones, such as agate and jasper, is the most popular course offered in industrial arts at Sul Ross State College in Alpine, Tex.

This course, known as lapidary, is offered for the first time at Sul Ross State College. Because the college is located in an area where volcanoes once abounded there are plenty of semiprecious stones in hiking distance of the college.

Dr. Delbert Dyke, professor of industrial arts, right, demonstrates the diamond saw used in cutting the stones to students, John Hale of Buckeye, N. Mex., left, and James Hopkins of Abilene, Tex.

Photography by Charles M. Hunter, graduating senior of industrial arts, Sul Ross State College.

☆ ☆ ☆

Join the March of Dimes January 2 to 31.

☆ ☆ ☆

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Association News

THE INDUSTRIAL ARTS CONFERENCE

The members of the Industrial Arts Conference met at the Hotel LaSalle in Chicago on November 8, 9, and 10, 1956. The meetings were all well attended.

Dr. Verne C. Fryklund, who was the general chairman of the conference, opened the first meeting at 9:30 a.m., on Thursday.

The topic discussed at this session was "Unique Contributions of Industrial Arts to Secondary Education."

Unfortunately, the leader of this three-man panel, L. T. Smith of West Kentucky State College, Bowling Green, Ky., could not attend because of an accident he had suffered. His place was taken by Dr. Nalbach. The other members were H. A. Pederson and Louis V. Newkirk.

Mr. Pederson stated that in his opinion modern shop practice reflects advancement in good design techniques, and a greater design conscientiousness by the industrial-arts instructors of today.

He also expressed the thought that industrial-arts teachers should try to inspire their students to greater achievement in their own and in other subject fields, and assist them to develop habits of industry and thrift.

Industrial-arts teachers in high school should get their students to think and plan for their future, take interest in apprenticeship and/or advance education.

Dr. Newkirk emphasized the giving of experiences to the student that will help him determine vocational interests; develop ability to recognize quality and design in manufactured articles; and develop skills.

The general chairman of the second session was D. J. Crowley. The panel consisted of T. A. Hippaka, panel leader; E. R. Glazener, and M. Ray Karnes.

The theme of their discussion was "Significant Researches in Progress or Completed."

Dr. Hippaka first listed 35 items of what and how to conduct research studies in the field of industrial education. He also submitted a list of 37 master's theses in industrial education made at Iowa State College.

Mr. Glazener presented a survey of research recently completed or now in progress of completion.

He also gave a list of 14 research problems now under way at the University of Oklahoma, Pennsylvania State University, and Wayne State University; also 28 doctoral completed in 1955 and 1956 in various universities.

Mr. Karnes presented a paper titled "Significant Researches in Progress or Completed." In this paper are outlined the criteria used in selecting research problems; definition of terms; rationale of study and hypotheses; protocol of experimental design; equipment, testing, and instructional materials; and treatment of data.

Completed research projects also were studied as to the importance of goal-setting in learning; definition of terms; hypotheses; procedure; subjects, experimental and control groups, instruction and treatment; measurement of variables; statistical procedures; findings and conclusions.

The third session on Friday morning was under the chairmanship of Tom Diamond.

The theme of this discussion was "Effect of Automation. Atomic Power, Electronics, and Synthetic Materials on Industrial Arts." Dewey F. Barich presented the definition of automation by John Diebold, editor, *Automatic Control*, which reads as follows:

"To begin with, two kinds of phenomena seem to fall under the single, new heading of Automation. Although they are seldom, if ever, distinguished from one another in general discussion, they are really entirely different. On the one hand we have what I call 'Detroit Automation,' or advanced mechanization. On the other hand, we see the growing use of automatic feedback control. Intelligently pursued, both avenues of development can lead to highly automatic operations. Both approaches are technologically and economically significant. And both are certainly worthy of much consideration and analysis — 'Detroit Automation' — to a company like Ford is primarily the integration of machines with each other and the automatic handling of parts. Electric and hydraulic controls permit the loading and unloading of special purpose multi-stage machine tools, while large transfer machines move workpieces from one operation to the next — the concept of feedback — the closed loop, or self-correcting system of controls — is basic to the technology that underlies this second meaning of Automation. Oil refineries rather than automobile plants are here used as examples of the direction in which the automatic factory will develop — not merely because these process plants are more automatic, but because they are designed around such a closed system."

(Continued on page 6A)

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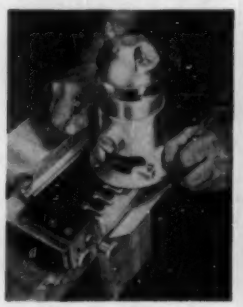

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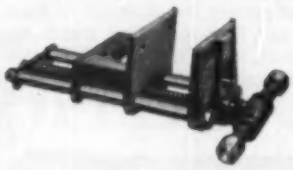
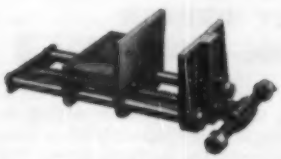
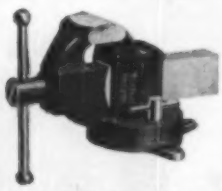


CONTINUOUS SCREW WOODWORKING VISE



18-A DUAL PURPOSE WOODWORKING VISE



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ASSOCIATION NEWS

(Continued from page 4A)

The stepped-up demand for skilled workers resulting from automation indicates that our workers need to possess more skill. In 1914 about 5 per cent of our industrial workers were classified as skilled. In 1940, 7 per cent were skilled. In 1956, 14 per cent; in 1957, 17 per cent; and predictions are that in 1970, 50 per cent of them will have to be skilled.

Automation requires skilled technicians in areas such as hydraulics, electronics, mechanics, quality control and material handling. Work habits and attitudes are becoming increasingly more important in the fields of safety, orderliness, accuracy, quality, teamwork, workmanship, industriousness, and moral and ethical responsibility.

Besides all of this, there will be many more career opportunities, all of which will challenge industrial-arts educators.

Charles R. Kinison, the second speaker on this panel, stated that there seems to be no change in the types of pupils who elect the industrial-arts course since the atomic age has appeared and the behavior patterns and the activities found worthwhile and practical in the past will change very little.

The general chairman of the fourth conference was John J. Metz.

The subject for discussion was "Problems Encountered by Beginning Teachers of Industrial Arts," and the panel consisted of E. M. Claude and Earle B. Blanton.

The first speaker, E. M. Claude, enumerated eleven duties and problems which confront the beginning teacher, and also pointed out the reasons why these teachers are so troubled.

Some of these reasons are: lack of knowledge and understanding by school personnel and the public; lack of supervisory assistance; lack of proper financing; personal traits or habits; and the fact that many industrial-arts teachers are merely looked upon as custodians of the student *dumping ground*.

Mr. Blanton pointed out that beginning teachers have trouble with such assignments as sponsoring homerooms, conducting student clubs and committees, and meeting adult and civic groups.

They have trouble planning their work when they are confronted by lack of tools, equipment, and teaching materials.

Some of them need close supervision and they need help in locating sources where needed tools and materials can be bought.

The fifth conference was held on Saturday morning under the chairmanship of Verne C. Fryklund.

H. O. Reed was the panel chairman, and he and Asbury Smith and Leon Bibb discussed the "Theories of Industrial Arts Education."

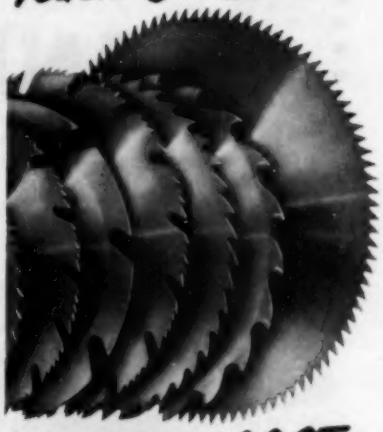
The business meeting was held immediately after this conference.

The new members inducted into the membership of the conference are Floyd Kruback, Kearney State College, Kearney, Neb.; Lawrence C. Sechrest, department of industrial arts, Northern Illinois State Teachers College, DeKalb, Ill.; Nelson Grote, state industrial-arts supervisor, Kentucky; Dr. Wm. E. Wright, industrial education department, East Texas State Teachers College, Commerce, Tex.; Dr. Berge Cunningham, dean of Bennett College, Bradley University, Peoria, Ill.; Dr. Benjamin C. Tinnell, professor of industrial arts, State Teachers College, Johnson City, Tenn.; and Coleman Hewitt, Chicago Teachers College, Chicago, Ill.

The 1957 meeting of the Industrial Arts Conference will be held on November 7, 8, and 9, 1957, at the LaSalle Hotel, Chicago, Ill.

(Continued on page 16A)

Teaching is Easier—



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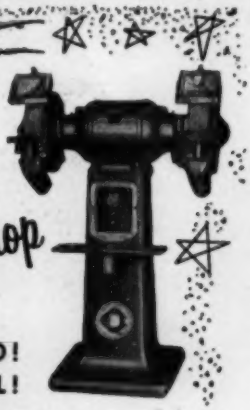

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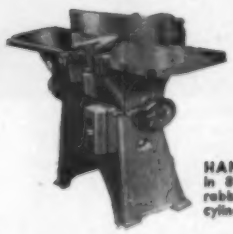

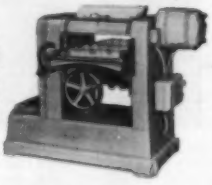

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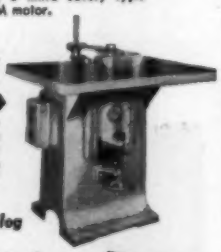

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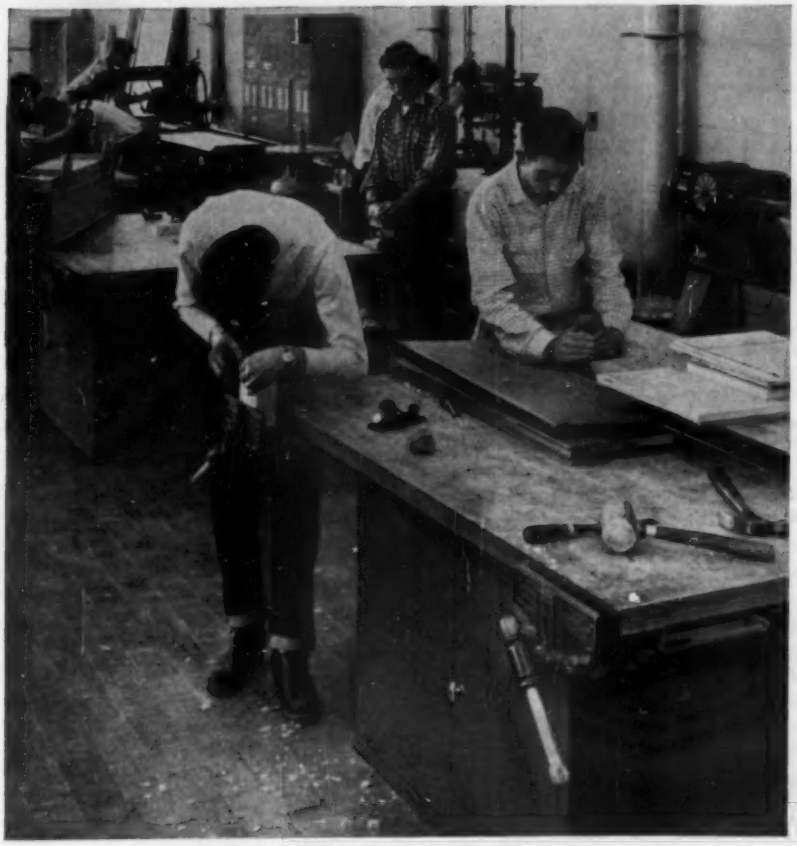

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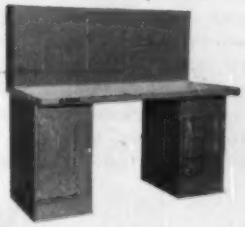

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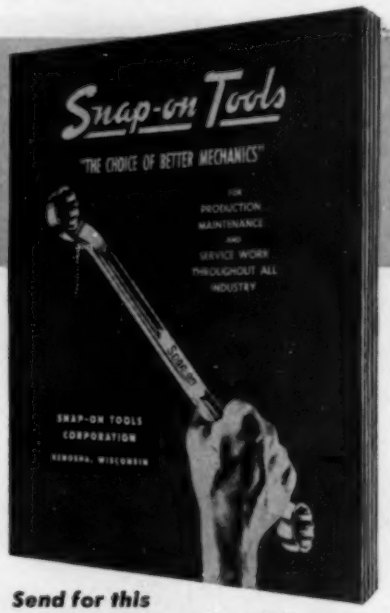
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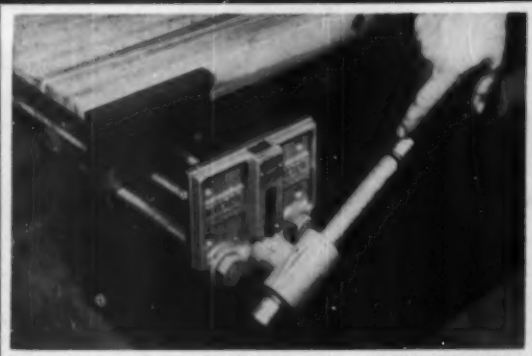

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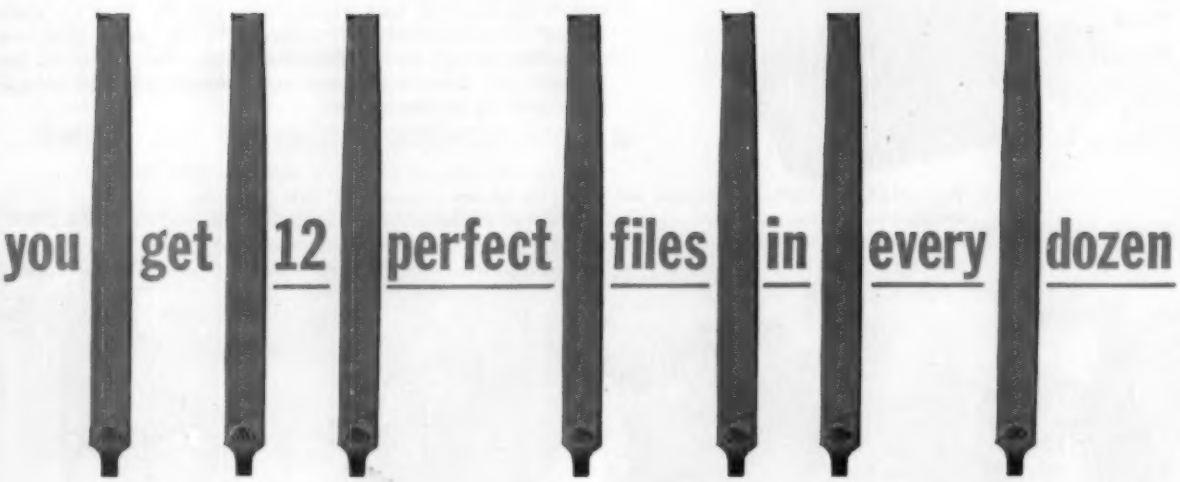

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
JANUARY 1957

A Great Help—

Developments in Industrial Co-operative Teacher Education

DONALD G. LUX
Assistant Professor, Industrial Education
University of Illinois
Urbana, Ill.

The problem of how to integrate the trade proficiency required of an industrial vocational teacher with the basic components of a teacher education program has been of increasing concern to those interested in a comprehensive program of secondary school public education. The most common approach to the problem has been an attempt to select individuals already proficient in their trade and then to provide them with general and professional education comparable to that received by regularly certified teachers in other fields. The futility of inducing adequate numbers of skilled tradesmen to enter teaching by this means is becoming increasingly evident. One evidence of this hopelessness is the fact that *every* state, of the thirty that last year (1955) required high school graduation and four years of college for secondary school certification,[1] excepted trade and industrial teachers from degree requirements.

Can Craftsmen Be Attracted to Teaching Jobs

Practical reasons why tradesmen cannot be attracted to teaching positions are abundantly in evidence. Tradesmen earning $6,500 to $7,000[2] generally cannot afford to lose this income and spend, in addition, the amount necessary to attain a college degree. This is especially so when the prospect, after having made this sacrifice, is a starting salary of $3,000 to $3,600 a year.[3] Other factors in this situation are: (1) experienced tradesmen tend to have established themselves both in their communities and as family men who cannot easily break away from local ties to accept employment in other communities, and (2) present trends are toward an ever increasing specialization of training for tradesmen while trade teachers still need varied trade preparation.

The efficacy of traditional trade and industrial teacher education methods can be questioned on other grounds than the practical. For instance, some professional educators hold that an integrated teacher education program that takes advantage, throughout the curriculum, of the interrelated aspects of the general, special, and professional phases of a comprehensive program provides greater opportunity for learning and therefore potentially can provide the best teachers.

Other difficulties facing conventional methods are: (1) teacher training agencies have little or no voice in the type of trade experience prospective teachers obtain because it is *fait accompli* at the time they first appear for formal teacher education, and (2) many secondary schools do not have vocational enrollments to support full-time teachers in each trade area. This latter difficulty necessitates having trade teachers who are qualified in other areas of a school program.

Certain of the difficulties being encountered within industrial vocational teacher education are common to teacher education as a whole, but there are inadequacies and inconsistencies which are unique to this field. Among these are:

1. On the one hand there is an evolving philosophy that vocational education is an integral phase of public education, and on the other hand there is a universal pattern of differential certification requirements for industrial-vocational teachers.
2. In the face of mounting demands for ever more skilled workers, swelling day trade enrollments, and expanding adult vocational programs, industrial-vocational teacher education institutions generally are making little or no effort to broaden the base for recruitment to provide an adequate supply of trade teachers.
3. Teacher education programs generally recruit teaching candidates from high school graduates who have not yet established families and entrenched themselves in an adult community.

[1] W. Earl Armstrong and T. M. Stinnett, *A Manual on Certification Requirements for School Personnel in the United States*, National Education Association, 1955 edition.

[2] John Emmel, "A Vocational Teacher Talks About Salaries," *AVA Journal*, Oct., 1955.

[3] *Ibid.*

Trade and industrial teacher educators have not availed themselves to any appreciable extent of this supply of potential teachers.

4. There has been a rapid advance in certification requirements for teachers as a whole, while the certification requirements for industrial-vocational teachers have remained relatively unchanged. As late as 1926 no state required a college degree for teacher certification.[4] In less than 30 years more than half the states adopted this as a minimum requirement. In the same span no state has enforced[5] this as a requirement for industrial vocational teachers.

5. There has been recent widespread effort on the part of some groups, in reports such as *General Education in A Free Society, Education for All American Youth, The Improvement of Teacher Education,* and *Higher Education for American Democracy,* to establish bases for some phases of education in a free society. No comparable efforts have been made during this same period by vocational education groups.

6. There is general recognition that an industrial-vocational teacher must be technically competent but that this in itself is not enough qualification for effective teaching in the modern high school. Yet there has been little comprehensive planning to provide adequate numbers of teachers with professional and citizenship competencies as well as trade proficiency.

The Co-operative Plan

The co-operative plan,[6] used so successfully for half a century in the closely allied field of engineering education, has long been considered potentially able to solve many of the problems and inadequacies in conventional trade and industrial teacher education. David Snedden, of Teacher College, Columbia University, presented the first proposal for a co-operative method of preparing trade teachers. Back in 1924 he wrote as follows:[7]

> Within a few years it should prove practicable to devise a total program for teacher training for at least a number of the trades and industrial vocations for which school vocational training in whole or in part should prove expedient and necessary.
>
> Such a program should almost certainly include the following elements:
>
> 1. Enrolling in the training school at 18 years, the prospective teacher should be allocated to wage-earning participation in his trade on some part-time basis whereby he could give sufficiently prolonged periods, perhaps 8, 12, or 16 weeks, to wage earning work, after which he would return to the school for a period of perhaps half as long for intensive study of the related subjects of the vocation in question. During this time, too, he could be directed in a moderate amount of reading of a pedagogical nature designed to be preliminary to his later pedagogic study.
>
> 2. After four years of this practical training and productive work, the prospective teacher should then turn his attention exclusively to pedagogic preparation. He should take the usual studies basic to the training of teachers, emphasis always being placed upon the peculiar character of the teacher vocation into which he is expected to go.
>
> 3. During the last, or sixth, year he should divide his time between further pedagogic studies and supervised practice teaching in successful industrial schools.
>
> The net outcome of this training process should be a teacher adequately prepared to enter not only all ordinary teaching, but also any necessary related technical instruction and instruction in related subjects.

Nothing approaching the comprehensiveness of this program that was suggested over thirty years ago has received anything but the most limited acceptance in vocational-industrial teacher education practice. However, concern for a co-operative plan has continued, as evidenced by the following statement by William B. Hawley, in 1951, when he was Assistant State Superintendent of Public Instruction in Michigan:[8]

> For some vocational teachers in the business field, the industrial field, the agricultural field, the *content* must be obtained by experiences on the job — enhanced, enlarged and broadened always by the formal school contacts in that subject matter area.
>
> . . . It would, therefore, seem relatively simple (but a long, long time in coming) for teacher educating institutions to recognize this and to provide planned experiences in the business, agricultural and industrial world for all who plan to teach in those areas.
>
> Such planned experiences should, of course, be worthy of appropriate college credit toward the "teaching major." In such a planned program by teacher educating institutions, it would be possible to produce a supply of teachers in various occupational fields, and it would not be necessary, as it now is, to recruit such teachers, without professional teacher training, from the ranks of industry directly.
>
> Much has been said about the desirability of work experience for teachers of all subjects so that they can have some acquaintance with the world of work. Is it any more difficult for teacher educating institutions to plan and provide for this kind of experience than it is for the secondary school to do so for its youths, as is advocated by most writers in the field of education today? If both of these qualities are things to be done, the chasm of misunderstanding can be narrowed and the quality of teaching bettered.

Despite the success of the co-operative plan in engineering education (seven and one-half per cent of all undergraduate engineering students in the U. S. were enrolled in co-operative programs in 1953–54),[9] and the more than thirty years of consideration of it by industrial vocational educators, it has been employed in teacher education in this latter field only on a most limited basis. During the 1954–55 school year there were only three operating co-operative industrial-vocational teacher education programs in the entire United States.[10] This information is based upon a 100 per cent return on questionnaires sent to state department of education officials in charge of trade and industrial education in the 48 states. In September, 1955, one more program was added to this list. These programs are operating in the states of Illinois and Michigan. Similar programs are well into the planning stage in Arkansas, Florida, Indiana, Mississippi, and Tennessee.[11]

Table 1 provides data from which some of the characteristics of present programs can be determined. It can be noted that the programs possess a marked similarity but all differ in some detail. This indicates that these programs, as other teacher education programs, have been shaped within the policies, practices, and conditions that affect the operation of the sponsoring institutions.

Co-operative Programs Not Necessarily Confined to Large Industrial Communities

Table 1 also provides evidence for answering certain questions that are raised concerning the value of a co-operative program. Some of these questions, with answers based on data in Table 1, follow:

1. *Must a co-operative program operate in a large industrial community?* Only one of the four programs is in an industrial metropolis. The remaining three are in communities of about 50,000 population. One of these has varied industry, one rather limited industry, and the third little or no local industry. All three vary in their distance from a large industrial center. Another case in point would be the college-wide co-operative program at Antioch which has students outside the bounds of the United States and has regular placement on co-operative jobs from Milwaukee to Boston and from Cincinnati to Detroit. Some periods of employment at Antioch are only eight weeks in duration.

Although transportation and co-or-

---

[4] Benjamin W. Frazier, *Development of State Programs for Certification of Teachers,* U. S. Office of Education, Bulletin 1938, No. 12.

[5] The word "enforced" is used here since some states have passed legislation making a bachelor's degree a certification requirement for *all* teachers, but they have had to provide for an extension of the enforcement date because degree-holding vocational-industrial teachers are unavailable.

[6] Throughout this article "co-operative plan" is defined as an integration of classroom work and on-the-job trade and industrial experience, with all parts of the program planned and co-ordinated. This definition excludes from consideration as co-operative programs any that (1) simply provide credit for work that is not planned, supervised, and co-ordinated by the credit granting agency, and (2) give credit for trade and industrial experience gained before or after the academic work.

[7] David Snedden, "Training of Teachers for Vocational Industrial Schools: Some Future Prospects," *Vocational Guidance and Vocational Education for the Industries.* NSSE, 23rd Yearbook, Part II, 1924.

[8] William B. Hawley, "One Road for Education," *Nations Schools,* Oct., 1951.

[9] Henry H. Armsby, *Cooperative Education in the United States,* U. S. Office of Education Bulletin No. 11, 1954.

[10] Donald G. Lux, *Industrial Cooperative Vocational Teacher Education,* Ph.D. Dissertation, Ohio State University, 1955.

[11] *Ibid.*

dination costs will vary, depending upon location, it would appear that location does not present an insurmountable barrier to the successful operation of a co-operative program.

2. Will all the graduates remain in industrial jobs rather than follow careers in teaching? About 2 out of 3 of the 60 graduates of co-operative programs are presently teaching. When this is compared with the dropouts in other areas of teacher education, it appears, at least on the basis of the limited evidence available, that a larger than average percentage of graduates of these programs will stay in teaching. It can be further judged that co-operatively trained teachers who are teaching have decided to do so with considerable knowledge of conditions in other types of employment. They may, therefore, be more likely to become career teachers than those who know only teaching and to whom the grass appears greener on the other side of the fence.

Table 1
CHARACTERISTICS OF FOUR CO-OPERATIVE TRADE AND INDUSTRIAL TEACHER EDUCATION PROGRAMS

Characteristic	*Institution*			
	Wayne	*Western Michigan*	*Michigan*	*Illinois*
1. Year Opened	1946	1947	1951	1955
2. Number of Graduates (through 1954)	20	40	0	0
3. Per cent of Graduates in Teaching	50	70	0	0
4. Length of Curriculum — years	5	4	5	5
5. Degree Granted	B.S.	B.S.	B.S.	B.S.
6. Curriculum Content:				
General Education	49	42	45	49
Professional	28	32	20	19
Technical —				
On-Campus	12–23	26	20	30
Co-operative	24	18	25	17
Electives	0–11	10	14	13
Total Semester Hours	124	128	124	128
7. Per cent of Enrollment in Co-operative Program	90	90	100	50
8. Organizational Pattern	sem.	sem.	sem.	sem.
9. Alternating Period	sem.*	daily	sem.	sem.
10. Co-op. Firms	6	10	no data	no data
11. Occupational Prerequisite	none	none	none	none

*With the single exception that automotive mechanics majors alternate on a yearly basis.

3. Would a college or university be willing to grant credit for on-the-job experience? The four programs represent a state teachers college, municipal university, and two state universities. All grant credit for the periods of co-operative employment.

4. Can high school graduates be attracted to a 5-year program that offers only a bachelor's degree? It is undoubtedly true that the four co-operative programs currently enroll more full-time trade and industrial teacher candidates than any other four institutions in the U. S.

5. Must the college organization be adapted to suit co-operative program needs? All programs have completely adjusted the co-operative plan to the semester organizational pattern. Three programs simply offer alternate semesters of work and study. The program that operates on a half-day work program perhaps needs to offer certain required courses mornings one semester and afternoons another so that students on a particular work shift would be able to complete all curriculum requirements. It can be argued that shorter alternate periods of work and study than those provided by the semester or quarter system may be the ideal organizational pattern. Older programs such as those at Antioch and the University of Cincinnati College of Engineering do provide for shorter periods. A co-operative program for preparing trade teachers, because of partially different objectives, should provide students with at least one extended period of employment however the program is organized. This would enable trainees to obtain any added learning which may be gained from full-time employment which at least spans the seasons.

6. Can co-operatively trained teachers gain approval for teaching reimbursable classes? It can only be stated that this has been satisfactorily worked out in at least two states. The divergent positions in regard to a more complete answer to the certification question are presented by the following thesis and antithesis:

Position 1, presented by Vezzani:[12]

> . . . the policy of using apprenticeship plus journeyman experience as the primary basis for the selection or approval of trade teachers appears to be faulty.
>
> Since there is some doubt on the question, the state vocational staff in Michigan decided to interpret the apprenticeship standards for trade teachers liberally. As an experiment, it was decided to base the approval of trade teachers on their competence in their trade, regardless of how this competence was developed. Moreover, the competence of a candidate was to be determined by adequate tests, administered by qualified examiners.

Position 2, presented by Leighbody:[13]

> It is a great error to assume that any type of test yet devised, performance or otherwise, can measure the occupational competence of a prospective teacher. At best such a test can sample (and in a limited way) only the ability of a candidate to operate certain tools, or answer certain technical questions connected with an occupation. Knowing *about* an occupation is far from being competent to teach it. The most important aspects of occupational competence are not revealed by such tests, and can be understood only through rich and fairly lengthy experiences as a mature worker in the occupation.

It is apparent that adherents of the latter position cannot have their prerequisites for trade teaching met in a co-operative program that seeks to recruit its students from among recent high school graduates. Few youngsters would commit themselves to a program of preparation that, at least in actual months (as opposed to "school years"), is longer than that required for any profession. Five calendar years is probably the maximum length program that will permit competitive recruiting, at least until remuneration upon graduation offers greater encouragement for entering teaching.

The importance of this particular question cannot be underestimated in considering the ultimate development of a strong professional group. If certification requirements or tradition are such that they legislate against obtaining some of the most able high school graduates, the inevitable outcome will be a substandard and inadequately led group. Technically and intellectually able (and there is no evidence that these are antithetical) high school graduates are being attracted to engineering, law, medicine, and other fields at the time of secondary school graduation, both by mores which make further education desirable and by scholarships and aggressive recruitment by individuals and groups within these fields. If industrial vocational teacher education cannot compete for some of the best available "young blood" its welfare (and perhaps that of any industrial nation) rests with the action taken to remedy the situation.

Will Organized Labor Co-operate in This Type of Program?

7. There is little question that a co-operative program can be operated without the co-operation of labor by using unorganized firms as training stations. The real question is whether such a procedure is in the best interests of the program or its students. Organized labor is a significant factor in American industry. Having an understanding of and being able to work with unions may therefore be considered to be educationally significant for industrial teachers.

Unions, when they are fully informed concerning the objectives and operation of the co-operative plan, have frequently provided for co-operative trainees in labor-management agreements. They have also occasionally prevented the placement of trainees with certain firms. Because locals enjoy considerable autonomy in their operation, each place-

[12] A. A. Vezzani, "Must T&I Teachers Be Tradesmen?" *School Shop*, Nov., 1953.

[13] Gerald B. Leighbody, "T&I Teachers MUST Be Tradesmen," *School Shop*, Jan., 1954.

ment with organized labor must be worked out on the local level. Some may be expected to reject the plan while others will give full support to it.

Will Management Co-operate in This Type of Program?

8. C. E. Highlen made a study[14] in which 233 firms were asked whether they would be willing to co-operate in a co-operative program of the type considered here. Forty-three of the contacted firms indicated that they definitely would co-operate, while 67 replied that they could not co-operate. At first glance this would seem to be a discouraging situation. The results actually are most encouraging when considered from the standpoint that all the contacted firms were in a small area, and they provided more stations than would be needed by the largest industrial-vocational teacher education program.[15] It will be noted from Table 1 that the program with the largest enrollment at present has only ten co-operating firms.

9. *Will local school administrators employ co-operatively trained teachers?* Realizing the pertinency of the opinions of local school administrators concerning a teacher education program, a representative sampling of school administrators in the state of Illinois was approached to obtain their reactions to co-operatively trained trade and industrial teachers. The form sent to the highest administrative official in various schools with trade and industrial programs requested that the administrator indicate the type training they believed would best prepare a trade and industrial teacher for their system by ranking three possibilities: (1) apprenticeship plus journeyman experience totaling six years and 30 semester credits of teacher training courses, (2) five years of integrated trade experience and college work leading to a B.S. degree with half time on campus and half time in planned and supervised employment, and (3) any type of program they might prefer. In general, it can be stated that administrators of schools in cities over 100,000 population unanimously favored the first plan while administrators of schools in cities under that size favored plan two in a 13 to 1 ratio. Since there were more than ten times as many of the latter schools, it can be stated that the majority of school administrators favored co-operatively trained trade and industrial teachers.

There is considerable evidence that the co-operative plan is consistent with trends in educational theory and practice, that it can be made to work in various types of teacher education situations, and that it can attract comparatively large numbers of teaching candidates who will enter and remain in the teaching profession. What is now known about the co-operative plan should encourage industrial-vocational teacher education agencies to give it a real test.

[14] C. E. Highlen, "How to Secure the Cooperation of Industry," Mimeographed report presented at the AVA Convention, Miami, 1950.

[15] Each available training station provides work for at least two students, and some firms would provide more than one station.

Tacoma and Vocational Education Gains —

Tacoma Vocational School Addition

KARL B. KLUGE
Acting Administrative Director of Vocational Education
Public Schools
Tacoma, Wash.

In 1945 the local school district terminated their operation of the War Production Training Program. The building and equipment then in use was devoted to a full-time vocational-technical program. The building was a one-story brick structure 70 feet by 205 feet, providing 14,350 square feet of instructional floor space. The programs, all fully equipped under the War program, were sheet metal, arc, and acetylene welding, machine shop, carpentry, automotive mechanics and engineering aides.

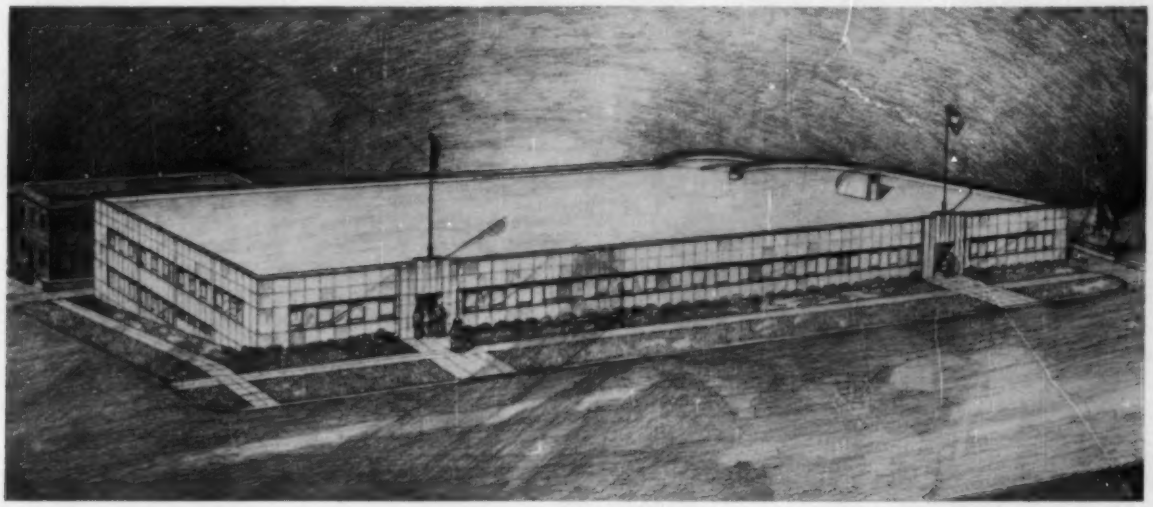
In 1949, a large three-story addition was added, providing a total of 108,675 square feet of instructional area. This present facility, valued at $1,253,727 and equipped at a cost of $487,277, covers a city block.

Despite many loud complaints that this was a white elephant and would never be fully occupied, the need arose within five years. The present facility was not only filled, but additional space was borrowed throughout the community to keep pace with the demands for training. In the spring elections of 1955, a $530,000 local bond issue received a 62 per cent majority. A larger building was made possible by the further authorization of $345,927 of State funds. This amount, granted by the Washington State Emergency School Building Commission, was full reimbursment of the building cost, based on 42 per cent out-of-school-district students presently enrolled in the Tacoma Vocational-Technical School. Half of the block directly south of the present building was acquired at a cost of $63,045. The proposed two-story building shown in the architects' sketch will be 279 feet by 107 feet, providing an additional instructional area of 59,700 square feet.

Due to the hillside contour of the site, street level entrances to the second floor, as shown in the architects' sketch, were possible. The paved alley across the rear of the property allows access to the first floor shops. Off-street parking for 101 cars is provided by ramping to the roof.

The new facility will be designed for the addition of a third and fourth floor. The contemplated expansion will use the heavy parking slab on the roof for medium shop equipment and allow the fourth floor for lighter equipment programs.

Provision is made for new programs, as well as expanded facilities for programs to be moved from the present building. At the alley level, the new automotive shop will be expanded to two instructional units and the larger body and fender shop will be equipped



Architect's Perspective of Addition to the Tacoma Vocational School

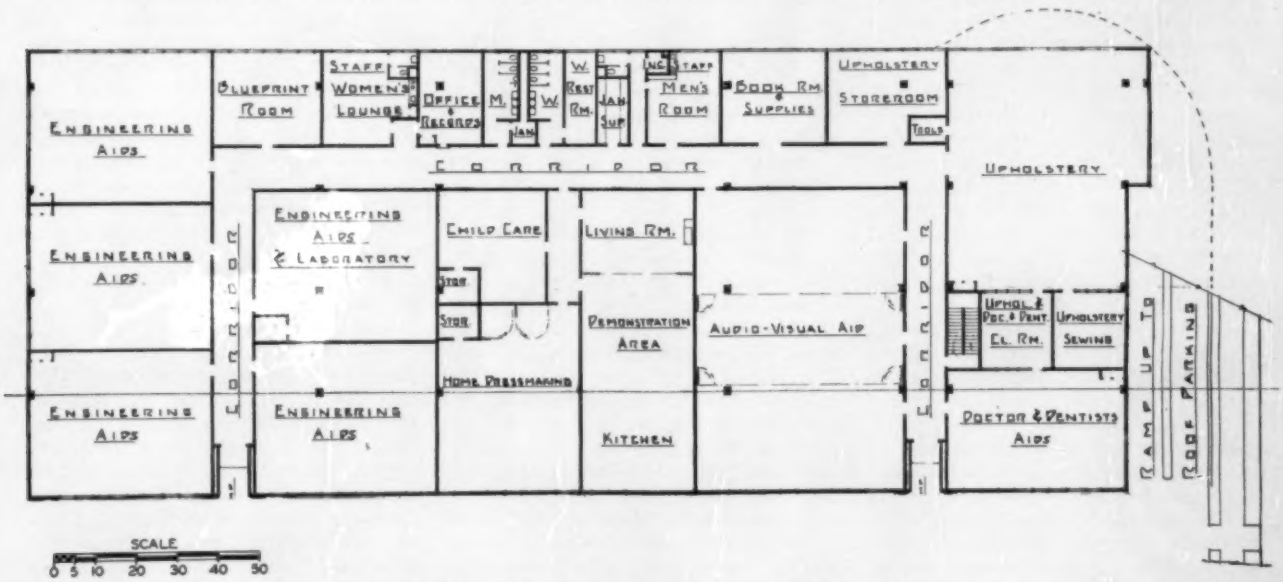
with the latest design in paint spray rooms. The paint spray room is so designed that a large truck or bus may be brought in from the alley, or the space divided into two rooms by a movable partition, allowing two cars to be touched up or painted at one time. Independent exhaust systems are to be operated for each of the paint rooms. Locker and wash-up facilities are provided in both areas. The lockers will be installed above the classrooms along with parts storage in perforated metal locked areas. The pre-stressed concrete beams are unsupported across the floor area, providing almost 70 feet clear width for car handling. The classrooms are relighted and adjacent to the toolroom for maximum instructors' observation and control. The exhaust system is of the under-floor type. This decision was made from an unsatisfactory experience with our present overhead exhaust system. Over-all fluorescent lighting of 50 lumens, together with more intense illumination over the benches and motor rebuild areas, is provided.

The sheet-metal shop has expanded floor space and arrangement from our present installation, including a relighted drawing and classroom area. Deliveries of heavy equipment and supplies can be made directly through the body and fender shop to the side door of the sheet-metal shop. Smaller supplies can be brought in through the hallway.

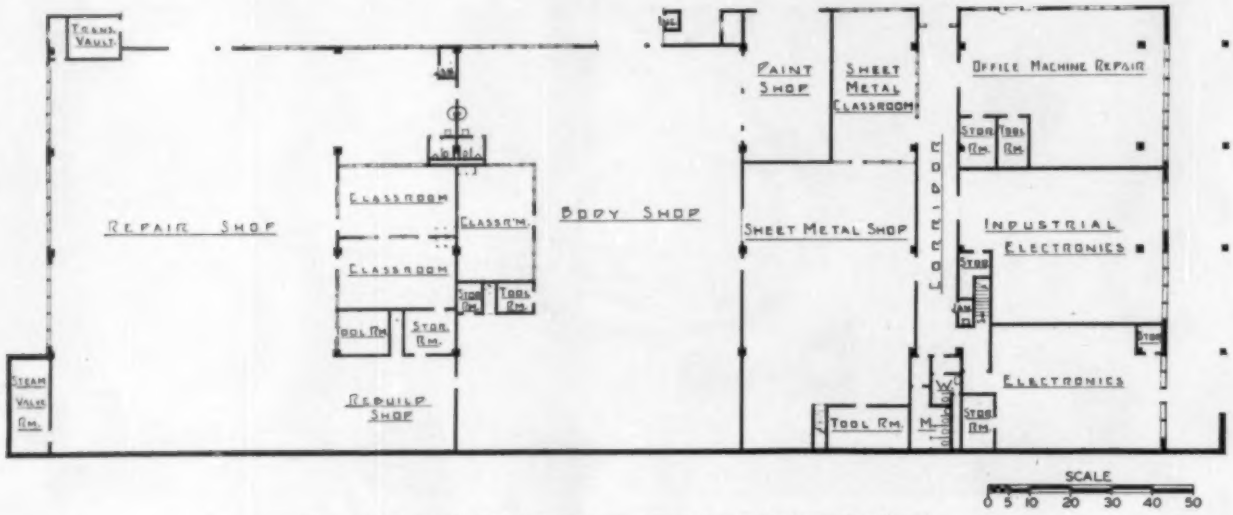
The two industrial electronics and business machine repair classes are new. We presently operate five instructional units of radio and television servicing and radio and television broadcasting, which also place people in the industrial electronics field. However, the instruction in industrial electronics will be directed to the rapidly expanding demand for electronic technicians. Business machine repair will provide instruction in the traditional typewriter and calculator service, but also will include electronic office equipment.

The second floor, facing on Yakima Avenue, will house dental assistants, a training program now in its first year of operation. The equipment will include X-ray units and the latest dental office equipment. The upholstery shop will offer enlarged floor space from our present building, together with a larger more convenient storage room.

The audio visual room is designed to seat between four and five hundred people for demonstrations and industry presentations. It can be divided into



Plan of Main Floor, Tacoma Vocational Technical School



Plan of Ground Floor, Tacoma Vocational Technical School

(Because of lack of space in this issue, the additional floor plans of this school will appear in the March, 1957, issue of this magazine)

two or three classrooms by folding partitions for smaller groups.

The home-economics department is a new addition to the Tacoma program. Domestic clothing classes will be operated for homemakers. Cooking and child care classes have been much in demand by young women and new homemakers. This installation will provide proper facilities for these classes for the first time and remove them from temporary quarters.

The engineering aides rooms will provide additional instructional space for the expansion of our present three unit program, including tool and die design. The rapid industrialization of the Northwest has absorbed larger numbers of engineering students each year, with no end in sight. Our program provides instruction in architectural, structural, and mechanical drafting and design, together with mathematics through trigonometry, practical application of the physical sciences, surveying and stress analysis calculations. The new facilities will duplicate the present satisfactory arrangement. The blueprint room will serve all of the engineering classes and will be equipped with a carbon arc, Bruning dry printer and ozalid machines for print reproduction.

The men and women staff lounges will be carpeted and provided with built-in study desks, library shelves, and coffee bar.

The small office will be used principally for an evening clerk, as most of the record keeping will be maintained in the present main office.

The building will be constructed of reinforced concrete. The exterior will be painted with the new Zolotone spatter paints. The floors will be surfaced with asphalt tile. Lockers will be built in flush and approximately 9 inches off the floor on both sides of the hallways. Ceilings will be dropped luminous plastic ceilings. Fluorescent lighting used generally throughout the building will have a minimum of 50 lumens with concentrations of light in specialized work areas. The two-way public-address system will be tied in to the main switch board of the present office, as well as telephone extensions. The master clock system will also be extended to the new addition. Central heating and other utilities will be extended through a pipe tunnel underneath 12th street, which separates the two sites.

A stairway to the parking roof is provided, eliminating pedestrian use of the ramp.

Last year 6863 people were served, of which 350 were high school students participating half day or full day in the trade and technical programs. Attendance totaled 1,070,000 hours. It is estimated that the increased facilities will show an increase to 1,200,000 training hours.

The moving of several of the classes to the new addition will allow considerable change in the utilization of the present building. The upholstery shop, adjacent to the practical nursing department, will be made into a ten-bed ward and classroom to serve an expanded program. The automotive shop will be connected to the Diesel shop, allowing additional floor space for test equipment and work stalls. The body and fender shop will be utilized for a plumbing extension class and the remainder added to the welding program, allowing for an increase from three to four instructional units. Additional space will be made available through the moving of the sheet metal shop and changes in the Diesel shop to house the painting and decorating program. This will mean enclosed sanding and finishing rooms, together with a waterfall type of paint spray room. Other building changes will make possible an expansion of the machine shop to one-third more floor area and provide double classrooms for related instruction. The moving of the engineering aides classes to the new building will provide doubled facilities and program for cosmetology and an additional utilitarian room devoted to foremanship and supervisory part-time classes. Also 1800 square feet will be added to the dining room to take care of the increased enrollment.

All plans were developed with the direct action of the instructors for the various areas. Both initial and final plans were presented to the joint advisory committees for their recommendations and approval prior to acceptance by the school board. It is through this co-operation with labor and management that the training facilities may be as modern and adequate as possible. It also insures an appraisal of future needs which will make the facility and equipment useful for several years.

The continuing demand for vocational-technical training already indicates full occupancy and enrollment upon completion of the building in March, 1958. There is little doubt that within two or three years, the need for the third and fourth story will be acute. The forecast of needs by our advisory committees demand that vocational education must develop long term plans even though construction may be achieved in small steps.

A Good Suggestion —

A Planning Aid for Architectural Drafting

HOMER A. MATTSON
Secretary, Mattson Builders, Inc.
Minneapolis, Minn.

The use of various kinds of planning aids is not new. Grids and graph paper have often been used in many areas of design.

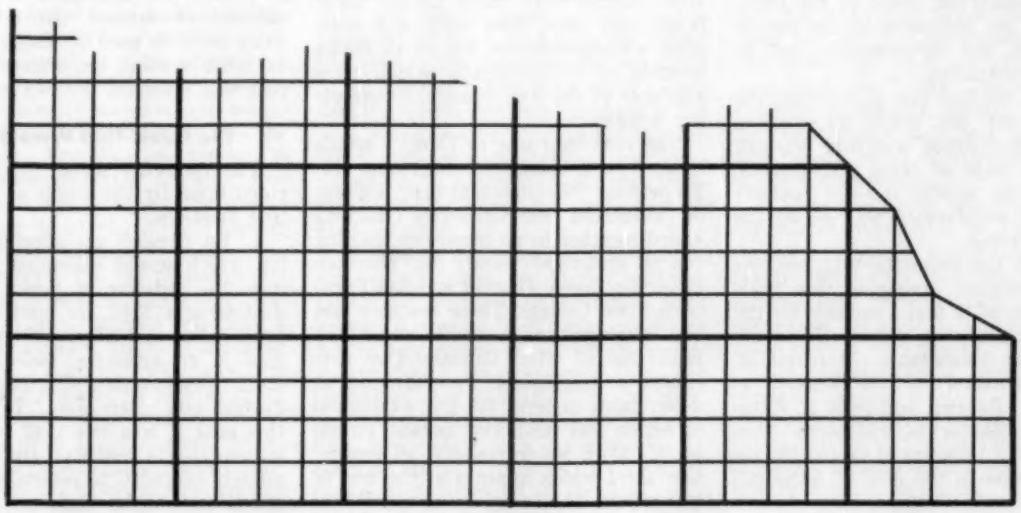
This planning grid is intended to help a student in architectural drawing to visualize the various layouts he will want to try while working out his final plans. It provides him with a good work sheet where he can try out his ideas, do his erasing and redrawing, and have the instructor advise and correct with a pencil if necessary. Since his work is done on a piece of tracing paper or onionskin attached to the grid, no one need worry about marring a finished drawing. If his paper has too many lines and too many erasures, he can remove it and start on a new sheet from where he left off.

The student has a good opportunity to sharpen his sense of proportion as well as visually answer questions as: How much room must I allow for a stair well? (He can work out a stair section on the grid.) How much room does a certain size door take for the opening and for its swing? How much does a wall take from any area? Am I allowing sufficient passageway between kitchen cabinets and appliances? Is there a direct line of vision from living or dining room to bath or from the front door to bath? There are many more.

Any problems regarding furniture arrangement may be worked out by using scale cutouts of the pieces involved and placing them on the plan. If it doesn't work out well in terms of traffic lanes and conversation areas, this is the time to adjust the room size, shape or position in relation to other rooms in the plan.

An instructor may define the problem in terms of his aims. He may wish to limit the problem to a simple garage, workshop, and storage combination. He may want the class to design a three room lake cabin and have them think in terms of the view, the access road and the use of the cabin and grounds or he may wish to go farther and work out a five room house defined in terms of a certain number of square feet. He may determine an approximate building cost per square foot for his locale and present the problem in terms of cost not to exceed $15,000 for example. The planning grid is a place to determine whether one set of over-all dimensions is better than another.

The grid should be drawn to a scale of ¼ in. = 1 ft. with every four foot line made heavier or in color. The grid should not be numbered as the student



Section of a typical planning grid

can number on the work sheet. By leaving off the numbers he can easily change to a scale of ½ in. = 1 ft. or 1 in. = 1 ft. for special details. Drawing the grid is in itself a good warm up exercise, especially if the student has been away from drawing for a while. The grid has further value in laying out a plot plan by changing to a scale of 1/10 in. = 1 ft. He can then plan the entire lot as to location of house, garage, drive, play area, utility area, trees, etc.

It would be well to caution the student against starting any plan in the corner. Try to start at least four feet from any edge in the event that he may need a projection from some part of the building. If cost is a factor in the problem then he should be encouraged to stay as close to a rectangular shape as possible.

The grid may be made on regular drawing paper and fastened to his drawing board. After a good explanation of using the grid and proper presentation of the problem, the student should be ready to try his hand at planning.

An Example to be Followed —

A New Approach to Library Book Selection

BERT MASON
Luther Burbank Junior High School
San Francisco, Calif.

Has this ever happened to you when the time comes to order shop books for your library? You approach the librarian and in a rather hesitant manner inquire, "Miss Books, I would like to order some library books for my shop students for next term. Can you tell me what is available?"

Miss Books replies, "Well, the best I can do is to give you these lists. It might take some looking to find shop books since all education areas are included on each list. Some of the titles, of course, are indicative of the nature of the book, but unfortunately, just as many are misleading."

So down the hall you go, carrying the lists but not too much information. After much fruitless searching through page after page of titles and authors, you begin to wonder if there couldn't be a more satisfactory way to do the annual ordering.

Some of the industrial-arts teachers in San Francisco, aware of this problem, attempted to find a solution for the teachers in their own system. Under the direction of consultants, Margaret E. Girdner, Director of the Bureau of Texts and Libraries, and Jesse E. Rathbun, Co-ordinator of Industrial Arts, they set up a program of evaluation for book selection in the field of industrial arts.

Their first step was to make a survey of all industrial-arts teachers in order to establish a list of subject areas which should have adequate book representation in the school library. Some forty different areas were included in the responses. Among these were such varied interests as bookbinding, jewelry, railroading, lumbering, manufacture of hardware, forging, drafting, conservation, foundry, and so forth. Following this Miss Girdner's office staff used the shelf list to pull titles which were in any way, shape, or form related to these areas. Cards were made for all these books, and from these cards was compiled a comprehensive list of all books relating to industrial-arts which were available in the San Francisco Secondary Schools.

The next step was to identify which books were of value and which were not. To perform this important task, a group of interested industrial-arts teachers joined together in an in-service training course sponsored jointly by the San Francisco School District and San Francisco State College. These teachers met one afternoon each week under the leadership of Miss Girdner. Our first efforts in this course were directed at determining criteria for the evaluation of fiction and nonfiction books. To aid in this work we formulated an evaluation sheet which appears at the end of this article. The books reviewed fell into the two standard categories; nonfiction included wood, metal, electronics, etc., and related areas in the field of industrial arts. Biographies of inventors, stories concerning industries and general engineering, books about hobbies were also included in this class. The second category included all good fiction with a vocational background. A special effort was made to find books which would emphasize good craftsmanship, use of tools, the dignity of a vocational life; for example such books as *T-Model Tommy* and *Lumberjack* by S. W. Meader, *Johnny Tremaine* by Esther Forbes, *Young Fu of the Upper Yangtze* by Elizabeth Lewis. Beyond teaching many attitudes which are important in an industrial-arts program, they would also stimulate reading by the students, and might well be used by the teachers to provide for individual differences in abilities or interest. In addition the titles could be used by English teachers to fulfill reading requirements, and in that way integrate the two fields.

The Goals That Were Set Up

The following set of goals was decided upon by the group at one of the first meetings.

1. To develop an approved buying list which would encourage and facilitate the ordering of books in the industrial-arts field for each individual school shop and library. At present the goal is an annotated selected list of 1000 titles covering all areas of the industrial-arts curriculum. In achieving this goal it was felt that perhaps the industrial-arts teachers are more adequately prepared to review such highly specialized books than would be the average school librarian.

To give impetus to the program, one

The program culminates in presenting a printed book list and brochure to delegates of the AVA convention in San Francisco in December, 1954

hundred dollars above the annual library budget was given to each of the 22 secondary schools for the 1954–55 orders.

2. To encourage industrial-arts teachers, through the provision of a list of current materials of interest to the students, to use the school library as a teaching aid.

3. To encourage shop students to recognize the importance of reading as an indispensable part of their educational experience. Industrial-arts teachers should take a more active role in teaching the reading skills necessary in their special field. The English teacher is basically responsible for teaching general reading skills, whereas the special area teacher must teach the reading skills peculiar to his subject matter.

4. To increase the use of books and libraries to implement the curriculum in industrial arts. It was felt that a better book program would be achieved in the shops if a set of books for a particular area, composed of several titles, were available to the teacher instead of one adopted text. If a boy could be interested in a book, perhaps about lumbering, he should have the opportunity to further that interest at home. Since the shop books would be noncirculating, there would have to be a duplication of titles in the library. In order to achieve this end, it would be necessary to build up, over a period of time, duplication of titles of the more popular books so that copies would be available both in the shop classes and in the library.

The committee held regular weekly meetings for eight months and in that time was able to evaluate most of the books which were already in the school libraries. Out-of-date material was withdrawn, newer publications were added, and the committee then prepared a list of approved books which could be used for the newer orders. These lists contained a brief comment about each book in addition to the name and school of each reviewer.

In order to keep the list of industrial-arts books current, one further step was taken. All interested shop teachers were asked to specify the types of books which they would be willing to review as the books were received from the publishers. The publishers, incidentally, have become interested in our program and have been very co-operative in placing review copies of their latest books at our disposal. A standing committee of these teachers was formed, and as each new publication is received, it is forwarded to an interested shop teacher for review and annotation. The mechanics of getting new books to committee members are handled by Miss Girdner's staff. A book is sent to the school librarian who in turn forwards it to the shop teacher. She then calls for it about two weeks later so that it may be circulated for a second review. In this way each book that appears upon our list has undergone comparative reviewing. It is the policy of the San Francisco School District to have teachers in different subject areas read and recommend each new book before it is placed on an approved list for use in the school libraries.

It is interesting to note that although we started out merely to facilitate the ordering of library books, several additional worthwhile achievements have already been recognized or can be expected in the near future as the program grows; for instance:

The industrial-arts teachers have profited through:

1. The feeling of responsibility in helping to provide a rounded collection of books for the school library in the area of general education.

2. A knowledge of the criteria for book selection which has given books a

BOOK EVALUATION FORM

Fiction

Author .....
Title .....
Publisher..... Date..... Price....
NOTE: *Underline or comment on items which apply to the book.*
Curricular value: .....
Reading level....Gifted...Average...Slow...
Interest level.....
Style: Simple..... Clear.....
Characters: True to life.....
Plot: Original..... Hackneyed.....
Simple..... Involved.....
Format: Satisfactory..... Unsatisfactory.....
Illustrations: Fair...Good...Distinguished...
Brief Annotation

BOOK EVALUATION FORM

Nonfiction

Author .....
Authority .....
Title..... Date..... Price....
NOTE: *Underline or comment on items which apply to this book.*
Curricular value:..... Informational.....
Personal interest.....
Reading level.....Gifted.....
Average.....Slow moving.....
Interest level.....
Scope:
Style: Simple..... Clear.....
Presentation: Brief..... Exhaustive.....
Selective.....
Physical features: Index.....Glossary.....
Appendixes.... Bibliographies.... Charts....
Any other reference features.....
Format: Satisfactory..... Unsatisfactory.....
Illustrations: Fair... Good... Outstanding...
Brief Annotation

A San Francisco shop teacher introduces a group of his students to some of the newest shop books from the school library
— Photographs by R. W. Kulmann

more important place in the shop program.

3. A recognition of the value of their influence in leading boys to read in a "personal interest" area.

The school librarian has profited through:

1. The establishment of an informed group to assist her in book selection.

2. The advancement of her program of making the library serve every student in terms of his interests.

The student has profited through:

1. Having a much wider selection of books which will provide for individual differences.

2. Having a wider selection of current books to keep pace with changing interests.

3. Having his shop experience expanded beyond four walls. A wealth of related material can vastly enlarge a boy's concept of things related to the shops.

We cannot expect to complete this program in six months or a year, but it is one which will continue as long as there are new books in the field of industrial arts.

Don Bosco Trade School

REV. EUGENE PALUMBO
Head of the English Department
Don Bosco Trade School
Boston, Mass.

When the old John Paul Jones School on Byron and Horace Streets, East Boston, Mass., opened its doors after the turn of the century, no one imagined that its classrooms would ever ring with anything else than the merry voices of youngsters learning their three R's. Today there is the whirr of motors, the harsh whistle of band saws, and the rhythmic humming of printing presses. The merry voices are still there, but they belong to high school students attending what is known now as the Don Bocso Trade School.

The change-over took place in 1946 when a Catholic organization of Priests and teaching Brothers, the Salesians of Saint John Bosco, received an invitation from His Excellency the Most Reverend Richard Cushing, Archbishop of Boston, to found a Catholic Trade School. With world-wide experience in the management of such vocational institutions, the Salesian Fathers and Brothers converted the Paul Jones School into a well-knit trade school in less than a year. By the fall of 1947 three shops were prepared to handle almost one hundred boys.

Students receiving instructions in the use of the jointer, the lathe, and the jig saw, at Don Bosco Trade School, East Boston, Mass.

At present Don Bosco is operating at its student capacity level — almost two hundred boys. In the meantime the waiting list has grown out of all proportions. It was this crying need for additional shops and classrooms that spurred on the idea of building an entirely new plant. According to present blueprints it will accommodate 600 students.

School Schedule

Class and shop schedules are geared on a week-long basis; that is, pupils attend classes full time from 8:45 a.m. until 2:45 p.m. for one week. The following week they attend their respective shops for the same length of time.

Working on the assumption that American industry needs young men who have had extensive practical and technical training to supply the need for skilled craftsmen, Don Bosco Trade School has left no stone unturned in equiping its various shops with the finest machines and tools available. Also, efforts were made to provide the equipment and tools which contact with local industry suggested as safe, practical, and practicable.

The Staff

Don Bosco Trade School is staffed almost exclusively by Salesian Priests and teaching Brothers, all of whom have been specially trained for their respective fields of teaching and shop instruction. Additional instructors have been assigned to the woodworking and printing shop due to the large number of pupils.

Local industrial leaders have commended the technique used at Don Bosco of giving so-called "on-the-job" experience to every student. This procedure has been found to stimulate pupil activity and to acquaint him with situations he will eventually face after graduation.

Looking Ahead

As plans reach completion for the new school, it is interesting to note that the shops will all be equipped with standard industrial equipment. Don Bosco hopes thereby to prepare its boys for the industrial world of tomorrow.

If all the earth moved in the United States in one week by oil-powered and oil-lubricated machines were dumped at one place, it would form a peak as high as the Rockies. — *Petroleum Newsnotes.*

On an offshore oil drilling rig seeking petroleum 15,000 feet beneath the ocean bottom, lubrication of equipment alone costs $2,000 every 24 hours. — *Petroleum Newsnotes.*

Students at the Samuel Gompers Vocational High School, New York, get a view of on-the-job bending of lightwall electrical conduit. The scene on the screen shows the second stage of making deep saddle bend.

Republic Steel, 3100 E. 45th St., Cleveland, Ohio, distributes prints of the film throughout the United States for showings to groups ranging from trade school students as shown above, to apprentice electricians, professional journeymen electrician organizations, and to contractors

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

UNCOMMON ALTRUISM

THE Veterans Administration recently reported a most uncommon type of generous humanitarianism. The Jules Sanders family of Los Angeles — mother, father, and son — have devoted more than 17,000 hours giving service gratis to ill and disabled veteran patients.

They began their volunteer work at the Los Angeles Veteran Center in 1944, in the recreation program arranged for patients confined to hospitals or homes. The demand for their services soon became so great that they had to ask friends to help in this fine effort to make the lives of the sick and suffering a little more pleasant and bearable.

They organized the "Funtimers" who offered entertainment, brought gifts, and arranged three parties a month for hospitalized veterans. For eight years they have served refreshments from their treat wagon every Sunday.

The son started when he was 10 years old. Of course, at that age he was not permitted to enter the wards, but even at that time he soon had a number of routine jobs at the recreation office. As he grew older, it was just natural that he would assist his parents at their work, and his record shows that he has spent more than 5000 hours of volunteer work since 1949.

Now that he is a college student he visits the center evenings and week ends to do his stint as an active member of this uncommon family team.

To show their appreciation to the Sanders Family, the Veterans Administration Voluntary Service Program recently presented them with gold medals at a special ceremony.

It is well to point out examples of this kind to the students from time to time. Our youth are being brought up in an era of our history, when it does not seem to be as common to help one's fellow men as it was in the earlier days of our country. It is more than common now to find youngsters who seem to take delight in damaging other people's property rather than offering aid. A little effort spent in instilling neighborly love into our students may not be amiss.

INDUSTRIAL GROWTH OF THE STEEL INDUSTRY

THIS year marked the fiftieth anniversary of the American Steel Industry. In 1906, just fifty years after the invention of the Bessemer converter, construction was started on March 12 on a Midwestern steel plant which was to become known as the largest in the world. On April 5, the first electric-arc steelmaking furnace went into operation in Syracuse, N. Y., under the supervision of its inventor, Paul Heroult.

In 1909, when the plant in the Midwestern city was started, the population of that community was 13,000 and the mill's output was 573,000 tons. At the present time (June, 1956) the population is 156,000 souls, and the plant has poured more than 6,500,000 tons in one year. Since its beginning this plant has produced over 170 million tons of steel for ingots and castings during its lifetime, and its annual output at present is six times what it was when the steel plant was founded fifty years ago.

To take care of the increased need for high-grade alloy and tool steels in the early 1900's, the electric furnace turned out finer-quality steels by the ton, than did the crucible pot method by 100-lb. heats. In 1916 crucible production was second highest in its history at 135,180 tons, while the electric furnace output had risen to 145,551 tons.

Today, electric furnaces account for 11.2 million tons of the steel capacity of the country, or 8.8 per cent of the total.

It is one of the curious twists of history that in the year in which more than 28,000 buildings in San Francisco were devasted by an earthquake, a plant and a process began which together would make more steel than is needed for the construction of many cities of equal size.

THE WEEK OR TWO BEFORE CHRISTMAS

THE school year 1956–57 is practically half completed. It is still possible to make necessary changes in your present course, or shop and equipment layout to improve the results which you expect to obtain from this year's work with your students.

Probably bottlenecks have developed which hamper the progress of the class. These bottlenecks may be due to lack of the proper equipment or materials, poor class management, restricted working space, poor lighting, etc. If any of these causes exist, it is well to analyze the trouble and try to see what can be done about it, and at least get something started to alleviate the things that are holding up the progress of the class.

Then, too, you may need new projects. This is the time to look around for them, or design and construct them. Probably because the holidays are so near at hand, many of the students have practically finished the projects that they want to use as Christmas presents. The problem then is to start them on a short job, probably even one on which the entire class can work together.

In the students' homes it is quite customary to do a great deal of house cleaning. Why not do it in the school shop, too? Under proper guidance the boys will do very well, and the school will profit by their activity.

If time is short, at least straighten up the stock racks. If there is time, have the students vote on another clean-up job (varnishing the benches), or a job like making Christmas tree stands, or the repairing or making of some colorful toys. Give the youngsters a taste of a grownup's enjoyment of preparing for a joyous festival like Christmas.

TO YOU AND YOURS

OUR heartiest good wishes for Christmas and the new year to our readers and all men of good will.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

SPEED KILLS

DO YOU KNOW — Increasing speed to *gain* a few minutes increases the death risk?

The following table illustrates how little time is saved by increased speed. From 55 to 65 m.p.h. the death risk is nearly doubled.

Crusing Speed	*Average Speed*	*Minutes to travel 20 miles*	*Minutes Gained*	*Death Risk**
35	34	35	..	45
45	42	29	6	61
55	48	25	4	85
65	53	23	2	160

*Drivers involved in fatal accidents per 1,000 drivers involved in injury accidents. *Just What Do You Do With the Few Minutes You Save? Is It Worth the Risk?* — (General Plant Div., L. A. Dept. of Water & Power). — *Taken from Iowa State College Driving Laboratory News.*

Problems and Projects

KEEPING DRAWINGS CLEAN

ANDREW VERKADE

Lakewood 8, Calif.

The beginning student in mechanical drawing almost always has a great concern over the cleanliness of his work. This is to be expected, since a conscientious student will take pride in presenting neat and clean drawings. We who have been in industry and professional offices need not be told of the many tracings we have seen that were dirt laden and smudged, yet the blueprints made from these tracings were clear and legible. An ordinary smudge made by a triangle or T square sliding over a line will not show up on the blueprint just as lettering done with 4-H pencils (by beginning students) also will not reproduce with great clarity. Linework and lettering must be sharp and dark for a clean looking drawing.

When a smudge has the same tone or density as a line or lettering, the drawing has a dirty appearance. To remedy this, the smudges can be erased or the lines can be made darker to gain contrast between line and paper. The former is a tedious procedure on the more complicated drawings, while the latter makes for a better reproduction.

With a little extra care and some patience, even the most complicated drawings can be kept clean, and the lines made dark without the use of messy powders or retracing.

The first step is to remove all graphite from the pencil points after sharpening them. This can be accomplished by sliding the point of the pencil with a twisting motion over a piece of velvet glued to the back side of the sand pad. Do not sand *pin points* on your pencils, they will break off, roll under your T square and cause vertical lines to come into existence which you did not draw.

The next concern is the paper. A cheap paper has its surface damaged when an eraser is applied to it. An expensive paper can also be damaged by erasers but of course to a lesser degree. Graphite can be made to stick to a damaged area much more readily than an area which still has the glossy surface of the paper intact.

When a line is drawn, it should be done with enough pressure so as to compress the fibers of the paper and leave the line beneath the surface of the paper. Now when triangle or T square slides over this line it will not smudge. Sometimes graphite is scraped from the point of the pencil due to contact with the straightedge. This graphite should be blown away lightly (no moisture please) immediately after the drawing of each line.

Contact between the paper and the hands should be avoided. The hands are coated with a natural moisture which will damage the finish or glossy surface of the paper. When placing arrowheads or lettering use a sheet of scratch paper under your hand where it would normally make contact with the drawing.

Another source of smudges is moisture from the hands which is transferred to the paper via the triangles. Triangles should never be turned over. A draftsman should get used to keeping the

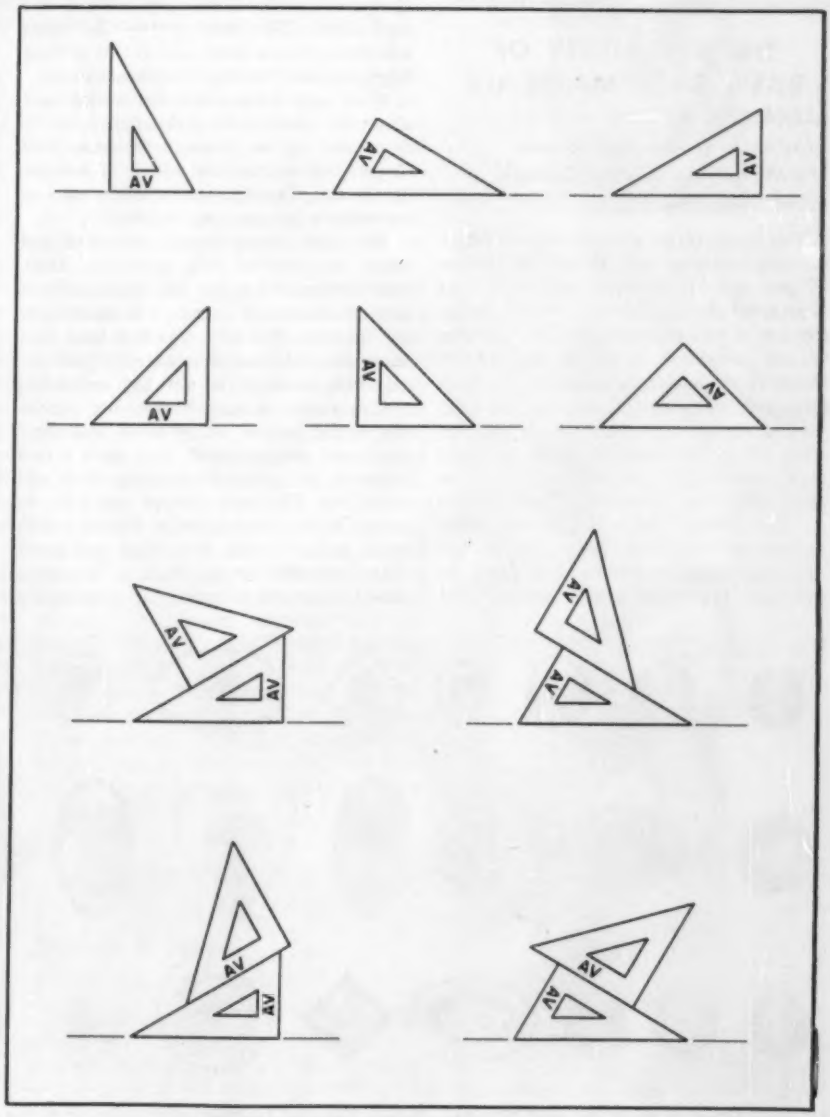


Fig. 1. Keep your triangles right side up

same face of the triangle in contact with the paper at all times, changing from 60 to 30 deg. by rotating the triangle, not turning it over. By this method, the hands touch only one side of the triangle. Your name or initials scratched in the triangles will help you to remember which side is up. For vertical lines the 30–60 is generally used which of course demands that the long leg of the triangle be vertical. See Figure 1. Also note that a circle can be divided into 24 parts without turning over the triangles.

All of the above comments and tips for keeping drawings clean are not intended for the beginning student in either college or high school. After the student has had an opportunity to acquaint himself with his pencils, instruments, and other equipment, then and then only should he be encouraged to make sharper lines and cleaner drawings.

THE VERSATILITY OF BASIC SHOP MATERIALS

ALEXANDER F. BICK
Teacher in Milwaukee Schools
The Milwaukee Downer College
Milwaukee, Wis.

This series began with articles on design for shop teachers; yet "design" in the age of jets and of chemistry and electronics is after all the development of new forms, the use of new materials, and the exercise of new freedoms. Many of the articles, therefore, dealt with the nature and method of contemporary design, and the remainder scouted the use of a most timely new material out of the chemical world: synthetic resin. Knowing its versatility, it would be no stretch of truth to name Castolite resin a school shop "find." This liquid, room-temperature-hardening resin fits so well into established procedure and works so well with criteria of urgent present need,

Real butterflies and ferns embedded between Castoglas-impregnated fiberglas fabrics, are placed into a decorative bowl.

that the choice for the articles was an obvious outcome of ordinary research and application. The resin proves its merit wherever given a place, and if this is done fairly, students accept it enthusiastically.

What must have struck the reader most about the resin is its wide application. It is to sum up its uses and to show them in perspective, that this article is written. In the end, Castolite resins will be seen as versatile in an amazing degree.

We have always thought of wood and metal as versatile shop materials. Then, one wonders, what are the characteristics and advantages of so recent a material as the Castolite type of resins that have in a short span of time replaced older and entrenched materials in our key industries.

The answer is easy to see, but not so simple for schools where wood and sheet metal are deeply rooted. How shall a new material be given place along with old materials? The best solution has been to accept it as a combination material with wood and/or metal. But, when and how? The best time to introduce it has been found to be just following the introduction of wood or metal, using the resin with the wood or metal on the second or third project. This is its natural place. As to how: printed directions as well as combination project suggestions are available.

Compare the versatility of Castolite liquid casting and laminating resin with that of wood. The resin does in a new way what other materials have done in rather cumbersome ways for centuries; and it does things no old materials have the facility to do. Look carefully at the impressive list of uses shown in the illustrations. These have brought new life into school shops and laboratories in fields as widely diverse as wood and metal shops, electricity, welding, auto mechanics, design, etc.; and then look closely at this list:

Small tile projects such as stands and trays.

Bowls of many types.

Tile or mosaic table tops.

Colorful creative wall panels and screens.

Acid tanks, fabricated special trays and cases.

Instrument covers, machine housing, and machine cover panels.

Student-made dies for drawing shallow copper or aluminum bowls, etc.

Student-made drill and spotting jigs and fixtures for holding any and all complicated parts for machine work and assembly.

Laminated chairs, as well as laminated seats and backs for wood or metal welded chairs.

Fiberglas-Castolite boats. Also boat decks, and boat covering.

Snow scooters; children's shallow-water play boats, surf riders, etc.

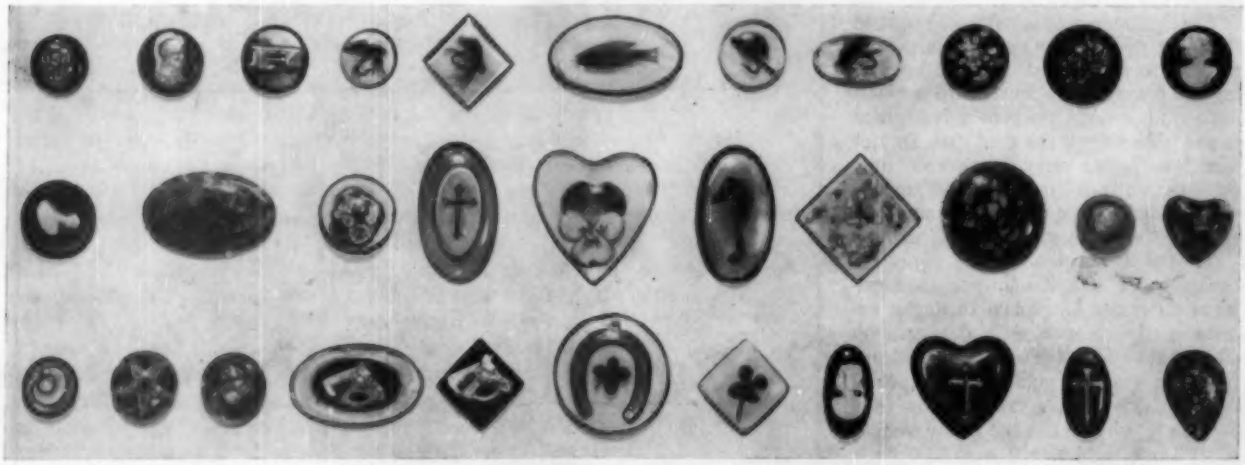
Auto body parts such as fenders, tops, etc.

Body repairs, house trailer repairs.

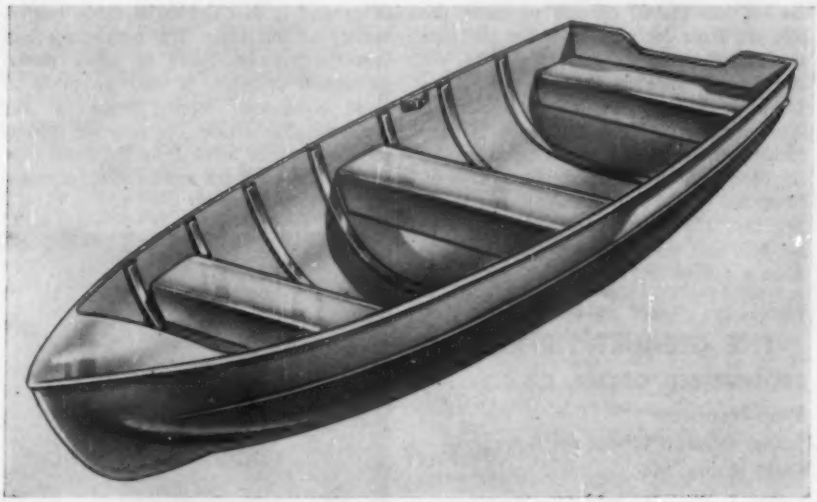
Pipe, gutter, and metal roof repairs; farm repairs.

Garden pools, cattle tanks, and birdbaths.

Structural panels, featherweight structural channels and angles.



Objects such as real flowers, leaves, shells, fragile minerals, and the like, may be permanently embedded in clear Castolite. These castings make fine jewelry, key tags, and other novelty items



This 12-ft. fiberglas-Castoglas boat weighs 115 lb. It was formed over an old but well designed wood strip boat. Building fiberglas boats is an excellent project for adult evening classes

Structural tile, waterproof coatings for basement walls and floors.

Radio chassis, small motor bases, control panels, and instrument covers and cases.

Scientific and industrial specimen embedment.

Creative jewelry such as pendants, cuff links, and earrings.

The student-made dies referred to deserve special attention. They are rugged pieces of equipment, showing no wear after such use. They are made of sand and ground glass fiber-filled Castolite resin, capable of withstanding more than 10,000 p.s.i. This means, among other advantages, that the machine shop of today, and any metal shop for that matter, has the means of expanding its facilities to include the teaching of methods and problems of competitive quantity manufacture which few present graduates know enough about. Designing and producing practical commodities in machine shop by the modern approach, has, in my opinion, far more present general value than has the cutting of a V block, for example; and the commodity may be designed to include V-block machining lessons. What seems important is that the student learns a superior lesson by actual participation in the solution of a common industrial problem. Using student-made resin dies and jigs in the manner of the most advanced manufacturing practice is the key to this expanded experience. (Photographs showing our die work are not available.)

Naturally, one cannot expect a teacher to accept and adopt a new material without at least having seen the casting and laminating procedure beforehand. This, and the fact that it is at present impractical to bring the visual process to the many teacher groups in the nation, brings us to a seeming stop. However, the time seems right for the adoption of resins in schools.

Happily, there is a way out for the busy teacher. Of course, you understand, all teachers are busy; and yet, he need have little to do with experimentation up to a certain point if he will assign the first shipment of material, together with the printed directions, to a student chairman and his group. They will work out what might take the teacher too much time. He will appraise the result. Following the first effort, each use will suggest others, and it is then simple, with the usual organization, for work with liquid Castolite resins to be part of the shopwork.

TV chair seat made of Castoglas-impregnated fiberglas fabric and mat

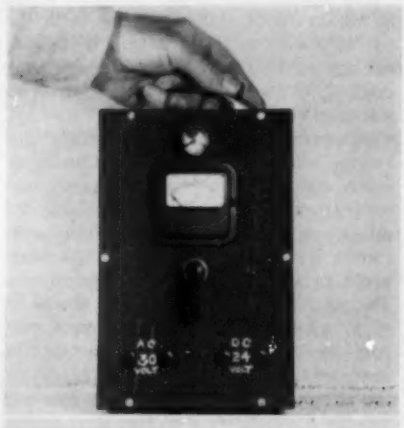
AN ISOLATED A.C.-D.C. SUPPLY

GEORGE P. PEARCE

Albuquerque, N. Mex.

For experimental work in electronics, the operation of low voltage electric motors and demonstrations in electrical physics, a safe a.c. and d.c. voltage is a necessity. On experimental work it has been found that 30 volts a.c. is a most useful voltage and when this is rectified the d.c. supply is about 24 volts which is also very handy and in addition neither of these voltages can give any shock, in fact, on a bare connection you can scarcely feel the 30 volts. By using an isolating transformer you can also avoid the possibility of a shock to ground which can appear in an auto-transformer wiring.

At first the a.c.-d.c. supply assembly was put on a breadboard but this was unsatisfactory, messy, and did not give very good protection on the 120-volt side of the transformer when inquisitive youngsters



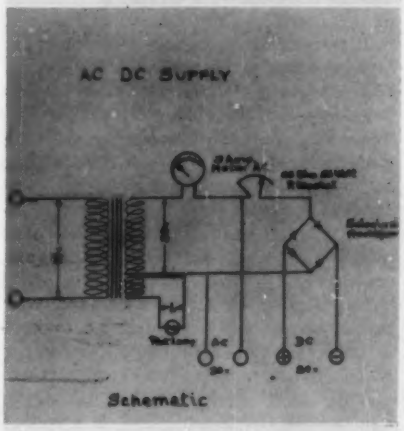


Fig. 1 (upper). The compact isolated a.c-d.c. supply. Fig. 2 (center). The schematic of the circuit. Fig. 3 (lower). The arrangment of the interior

were around, so the transformer, rectifier, and all wiring was put in a neat cabinet with banana plug outlets, and an a.c. ammeter, 0–3 amperes, was added, so the load could be easily checked.

The complete cabinet is shown in Figure 1 with a hand to show the compact design. The little pilot light above the ammeter is operated by the No. 2 secondary and is well worth the trouble of installation since it not only acts as a reminder that the power set is in operation but it illuminates the meter so the output can be checked in dark places.

The schematic is shown in Figure 2 and it will be noted that the meter is in the a.c. secondary so that the load is showing no matter if the a.c. or d.c. is being used. The 25 ohm, 25 watt rheostat is placed only in the d.c. circuit because a.c. equipment usually requires a steady a.c. voltage whereas d.c. equipment usually requires control so as to give a steady current. The metal cabinet is a standard Bud utility one, size 9 by 6 by 5 in. The transformer I used is a 117/30/1v 50 watts which is best adapted to my requirements. The particular transformer used should be of a suitable rating for the general purpose in view. The output jacks are the insulated banana type and are black for the a.c. output and the negative d.c., and red for the positive d.c. The arrangement of the interior wiring is shown in Figure 3.

The one volt secondary is for the pilot light which is a cheap one cell flashlight bulb and since it is operated at an undervoltage it has a very long life. The pilot lights whenever the transformer is energized thus telling at a glance if it is "on" or "off" and eliminating the possibility of leaving the unit "on" by accident. The pilot lamp gives sufficient light in dark places so the ammeter can be seen and read.

In selecting the transformer for your particular purpose it is advisable to keep in mind that the a.c. input ratings for low voltage selenium full bridge rectifiers are 25 and 50 volts maximum. The d.c. output voltages for the above listed rectifiers are 20 and 40 respectively.

NOTE: The metal cabinet has the advantage of a high heat transfer rate and the black finish is also a good radiator and this combination tends to keep the transformer and rectifier cool and permit a higher current delivery.

A SHOP KINK TO BE USED ON WOOD LAMPS

V. C. KNEPPER

Sarasota, Fla.

The device described herewith is one that may not be in general use.

In making lamps of wood, especially cypress knees, when a pupil bores a hole through the piece, he is likely to find that the bit has moved enough to make the hole too large for a good fit for the pipe nipple used in the socket for the light. We bore out the hole on the drill press to a size of ½ in., and glue in a short piece of ½-in. birch dowel rod. One inch is deep enough for the hole. Then, using an $1\frac{1}{32}$-in. bit, bore through the short piece of ½-in. dowel and thread this hole by using a ⅛-in. pipe tap. The pipe nipple will screw into the hole and since the wood is hard, will make a satisfactory fastening.

THE GIBAULT TIE RACK

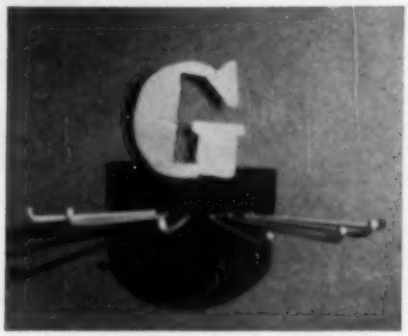
BROTHER LEO GEIGER, C.S.C.

Shop Instructor

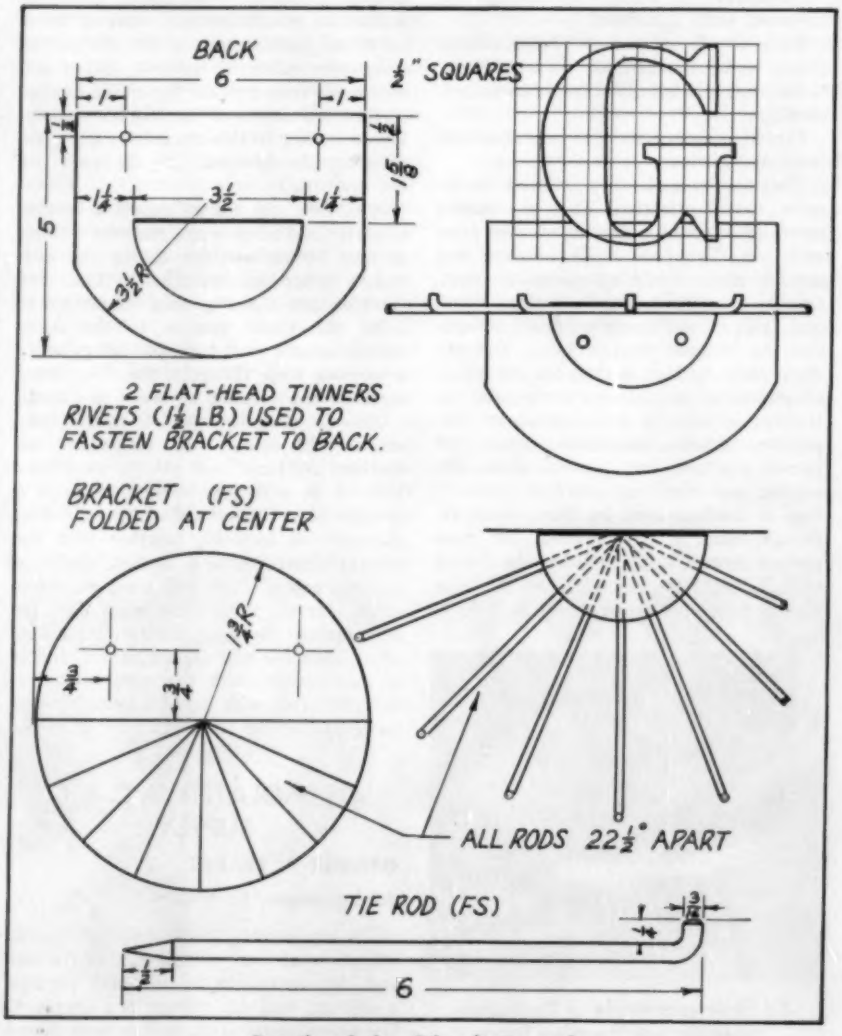
Father Gibault School for Boys

Terre Haute, Ind.

The project described herein is suitable for elementary sheet metal classes, general shop, as well as general metal shop work. One of the many advantages of this type of project is that it can be made from a variety of materials. The back piece and bracket may be made of sheet metal, galvanized or plain; it may be made of sheet aluminum, copper, brass, or any sheet metal available. The rods for holding the ties may be made from the same type of metal as the back and bracket, or welding rod may be used.



A Gibault tie rack



Details of the Gibault tie rack

Instead of using *G* for the top of the rack, any letter or any desired design may be substituted. The design of the back piece also lends itself to modification to allow for student originality.

A decided advantage of this project is that it requires little material, yet many of the fundamental operations must be used in its construction. For laying out the material, a rule, a compass, square, and a protractor are needed. The enlarging of an irregular design by the use of the block method is also used. Making straight and curved cuts with snips is necessary and in addition, bending both sheet and round stock must be done in making the bracket and tie rods. These rods can be soldered to the bracket although for some more advanced students brazing could be used; this, however, has been found to be slightly unsatisfactory. The bracket can be soldered to the back piece, but if rivets are used an additional training operation can be presented through this project.

Holes for mounting the rack to the wall and for riveting the bracket to the back plate can be made with a hand drill or on a drill press as the instructor desires.

The finishing operation depends largely on the type of material used.

WROUGHT-IRON CANDELABRA

C. WAYNE CLOSE

Glendale, Ore.

The candelabra described herewith are of simple design and can be constructed with a minimum of tools.

The base part of each of these candle stands is made from ⅛ by ½-in. mild steel. The pieces are cut and bent cold in the vise or over the side of the anvil. The parts are joined at the center of the base by electric welding or gas welding or brazing. The feet are bent to shape and attached in like manner.

The candle cups are made from two pieces of 16- or 20-gauge sheet steel. The cup base is simply a square of steel about 1½ in. in size. The holder is made by bending a rectangular piece of steel approximately 2¾ by ¾ in. into a cylinder.

The two parts of each of the candle cups are then brazed together and the whole set brazed to the base assembly.

The entire candelabra is then cleaned with emery cloth and given a coat of flat black enamel. The surface can be highlighted by dusting with gold or silver bronzing powder while the enamel is sticky.

An interesting variation of this project can be made by constructing the candle cups of 18-gauge copper or brass. Soft solder the parts together and to the base assembly. Enamel the base as before but put a high polish on the cups with tripoli buffing compound on a sewed cotton buffing wheel. The cups should be thoroughly washed with warm soap suds after polishing to remove all grease left from the polishing operation. Then dip in clear lacquer to preserve the polish.

MAKING A CHECKERBOARD

FRANCIS J. KAFKA

Kingsbridge Junior High School

New York City, N. Y.

An interesting and highly functional project for construction in the graphic-arts shop, including exploration into letterpress, linoleum block printing, and bookbinding, is the checkerboard shown by the students in Figure 1. It is a folding, two-panel board, bound in cloth, covered with attractive wallpaper, and lined with linoleum block printed panels.

BILL OF MATERIALS

No. of pieces	*Material*	*Size*
2	Chip board	6 x 12 in.
2	Wallpaper	5½ x 11½ in.
2	Checker printed lining	5½ x 11½ in.
1	Binder cloth	1 x 14 in.
1	Binder cloth	1 x 11½ in.
2	Binder cloth	1 x 13 in.
4	Binder cloth	1 x 5½ in.
	Glue (hot or cold, animal)	
	Paste (library)	
	Heavy waxed paper	

NOTE: The binder cloth can be distributed to the students in one length, 1 by 73½ in., requiring them to measure off the separate pieces and do the cutting.

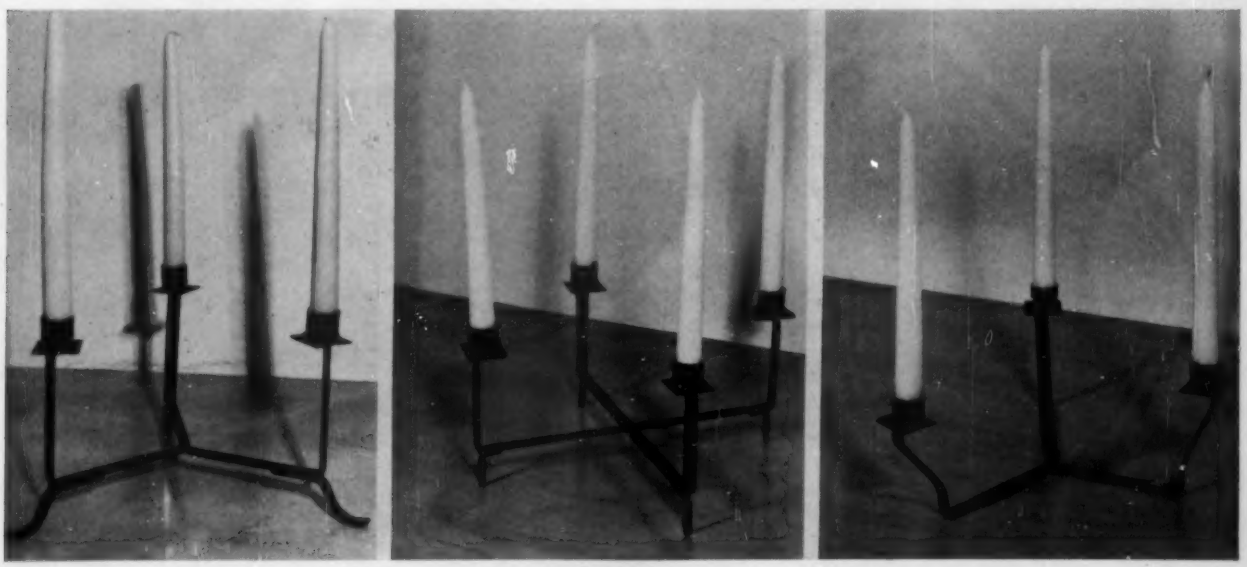
Tools and Equipment: scissors, rulers, pencils, glue brushes, book press.

Procedure

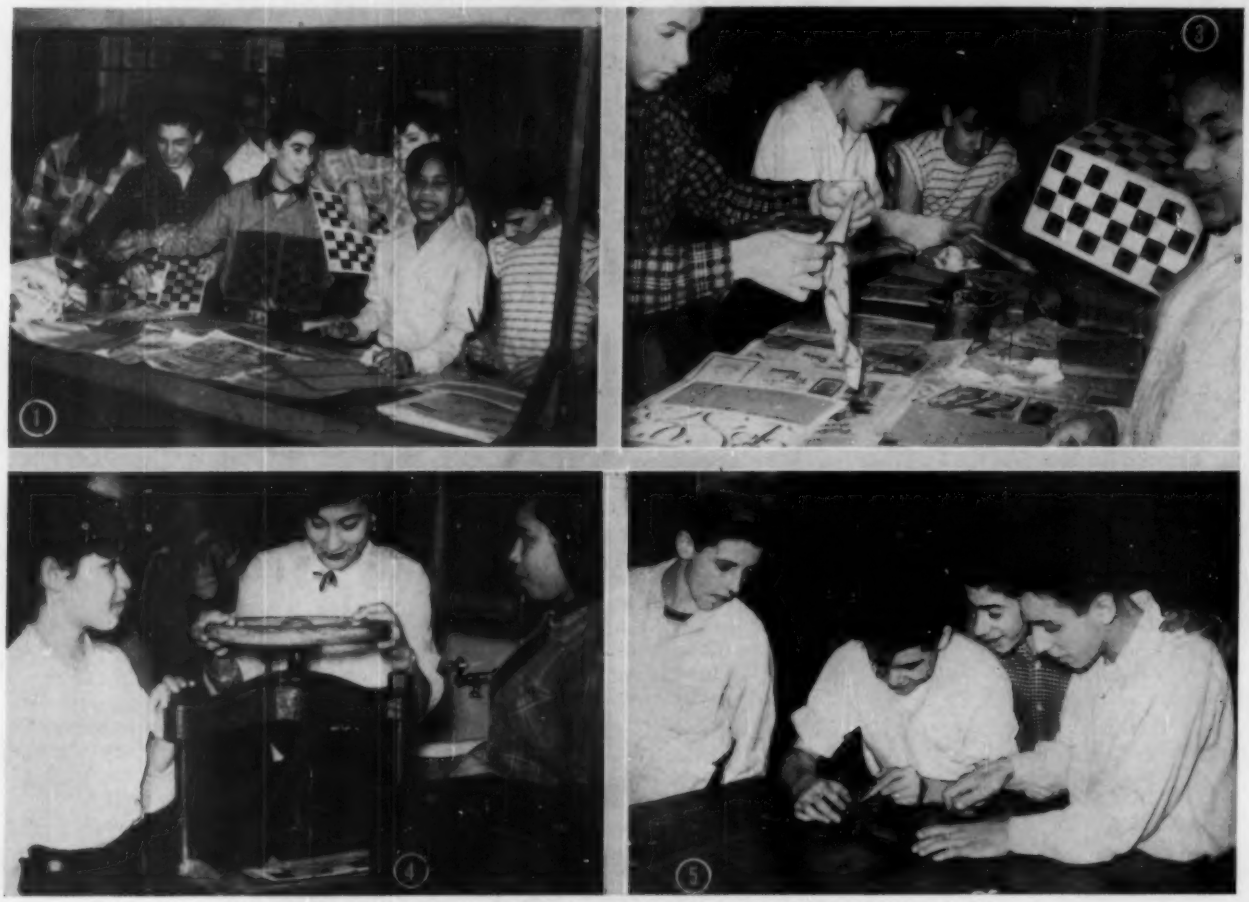
1. On the inside of the 14-in. strip of cloth, measure off 1 in. from each end and draw lines across the 1-in. width. Draw lines parallel to the edges, along the 14-in. length, ⅜ in. from each edge.

2. Apply glue to the inside of the 14-in. strip, now marked, and glue down the two chip boards along the 12-in. dimension, so that they are attached 1 in. from each end of the cloth and ⅜ in. from each edge of the cloth. This will allow ¼ in. between the edges of the boards. Before the glue sets, turn down the 1 in. of surplus cloth on each end so that it is glued to the inside of the boards, as indicated in Figure 2.

3. Now glue the 11½-in. strip of cloth onto the inside of the boards so that it covers the turned-in ends of the previous strip. The boards are now hinged together by a ¼-in. width of cloth between them, and the foundation of the checkerboard is laid.



The wrought iron candelabra made in three styles



Making a checkerboard

— Photographs by Francis J. Kafka

4. The 13-in. strips are next glued to the 12-in. edges of both boards so that ½ in. will cover each edge (back and front) with ½ in. extending at each end. This latter ½ in. is turned into a mitered corner on all four corners.

5. The 5½-in. strips of cloth are now glued to the upper and lower edges of the two boards, again, so that ½ in. will cover each surface of the boards, front and back. The 5½-in. pieces will suffice to cover the vacant space left between the mitered corner and the hinge strips, with a slight overlap.

When gluing, it is important to caution the students against using too much glue. A small quantity of glue permitted to get tacky will do a better job than a large

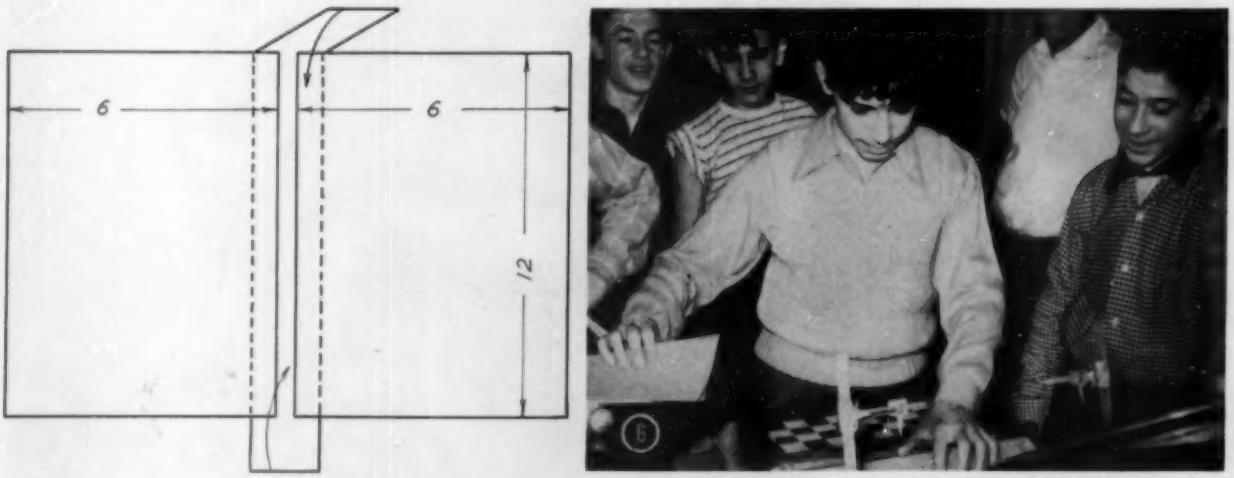


Fig. 2 and 6. Steps in making the checkerboard

quantity. A large quantity will make adhesion difficult and will tend to make the chip board too wet. If glued properly there should be no surplus oozing out from under the cloth strips. See Figure 3.

6. Rub the cloth forming the hinge briskly, with a small wad of newspaper, so that it is pressed well down into the space between the two boards. The *inside* of the folded checkerboard will be the side that has the 11½-in. strip of cloth forming the hinge. Fold the boards together, place a sheet of waxed paper between them, and another covering the outside panels, and press between layers of newspaper for one-half hour.

7. Remove from the press and remove wax paper. Using paste now, instead of glue, attach wallpaper panels to the outside halves of the checkerboard. Remove any surplus paste immediately with a slightly dampened cloth.

8. Next, paste the checkered panels to the inside halves of the checkerboard, being certain that the squares run alternately across the board.

9. Fold the checkerboard once again, interlay waxed paper as in Step 6, and press between newspaper and boards for at least 24 hours. This timing is important because the chip board becomes dampened with water from the paste, and unless the project is completely dried under pressure, warping will occur and the article will be rendered useless. See Figure 4.

Note that the use of glue *and* paste is suggested. This is not absolutely essential, but the cloth will adhere better to the chip board with glue. Paste, on the other hand, is more economical for attaching the paper panels. Ordinary animal glue, hot or cold, may be used, as no flexibility in use is required for this article. The application of glue and paste *each* requires a slightly different technique, so these techniques can be explained to the students at this point.

Procedure for Printing the Checkered Liners

1. Cut 16 squares of battleship linoleum, each 1⅜ by 1⅜ in.

2. Mount these squares, checkerboard fashion on a piece of hardwood, 5½ in. by 11½ in. by ¾ in. Mount by gluing the squares down and drying under pressure. See Figure 5.

3. This block is then locked up in the chase and printed on either a power or a hand press. The block is made type high by pasting the required number of sheets of super to the back of the block. A fairly hard packing will result in a dense black imprint. See Figure 6.

Additional work can be done on the blocks by having the individual squares carved with floral designs or emblems, various students working on the separate squares.

This project is an attractive and a useful one, thus furnishing the motivation. It combines the following graphic-arts operations:

1. Measuring and cutting paper and cloth.
2. Gluing cloth to chip board.
3. Pasting paper.
4. Pressing in.
5. Linoleum block carving.
6. Making a printing block.
7. Locking up in the chase.
8. Packing a press.
9. Make ready of a press.
10. Inking a press.
11. Feeding a press.
12. Washing a press.

The students feel a sense of accomplishment, they take home a useful project, and they learn for themselves the correlation in graphic arts, which we try so hard to teach.

WHAT STUDENTS THINK OF INDUSTRIAL ARTS

RALPH C. MAYO

Teacher-Coach — South High School

Vocational Instructor — Worcester Boys' Club

Worcester, Mass.

This September I gave my shop-drawing classes 10-11-12 a general test. This test included questions on safety education, woodworking, and mechanical drawing. One of the questions was "Do you like or dislike industrial arts?"

Here are some of the statements the students made:

"I like industrial arts because it deals in the making of something in which it takes skilled hands.

"It develops skills that can be used in later life. It develops the mind, and teaches us the power of visualization." — *Roger Salmonson.*

"I like industrial arts because I can see myself advancing in intelligence from year to year. Industrial arts will be a great help to me later on." — *Albert Locke.*

"Industrial arts gives me a chance to make many useful projects with my hands, but more than that, I leave the shop with a feeling of accomplishment." — *Daniel Casey.*

"I like industrial arts because I seem to have a talent for it. I find it more interesting than some other subjects. Industrial arts will help me in later life, if I want to build my own home or do work for extra money." — *Harold Herard.*

"I like shop drawing because it is a type of work I enjoy very much." — *Tad. Arnold.*

Each teacher is a salesman, selling his or her subject. We must put across the all-important lesson that our subject will pay dividends later on in life.

CURIO CABINET

DAVID PEYTON

Levittown, N. Y.

This project lends itself easily to the requirements of Early American decoration. It also serves an additional purpose for the woodshop instructor. The simplicity of design and construction place this project within the realm of achievement of the student and the home craftsman as well. The material selected for this piece should harmonize with the furniture of the room in which it is to be displayed. I have selected birch, finished in a honey maple and rubbed to a satin finish. Birch, being a close grained wood, does not need a filler. When the stain is applied and wiped the beauty of the grain of the natural wood becomes apparent. Although birch is classified as one of the hard woods, it is relatively soft and easily finishes quite beautifully.

Dish grooves may be cut into each shelf if the builder so desires. This may be done by dadoing a 3/16 by 3/16-in. groove, 1 in. from the back of the shelf as shown in Figure 5.

Equipment

1. Planer
2. 8-in. circular saw
3. Jig saw, 26-in. throat
4. Router, or drill press with routing attachment
5. Lathe, with three jaw chuck

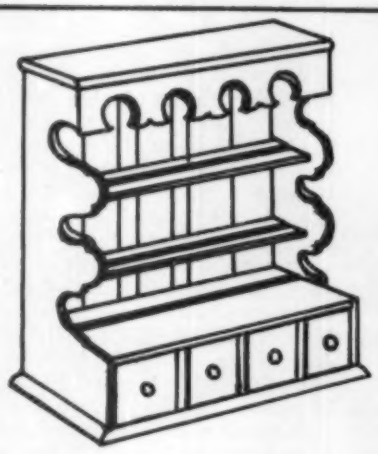
Materials

1. No. 2/0 and 6/0 garnet paper
2. Glue
3. Maple oil stain
4. Clear shellac
5. Steel wool
6. Paste wax
7. Polishing cloth

Procedure

1. Select the stock.
2. Plane stock to proper thickness and square working edges on jointer.
3. Cut to size all stock indicated in bill of materials.
4. Lay out and transpose design for the sides and molding as shown in figure one and two.
5. Cut out sides and molding on jig saw and sand smooth with 2/0 garnet paper.
6. Rabbet shelves, *A, B, C* in Figure 1, and the drawer parts *A, B, C* in Figure 4. Be sure in the following operations to use extreme care. Lay out the guide lines for the grooves in the two side pieces. The grooves should be identical in height, depth, and length to insure proper fitting and squareness. Fill all the holes with plastic wood, allow to dry, and sand smooth with 2/0 garnet paper.
7. Assemble and glue pieces *A, B, C, D,* and *E* in Figure 3.

CURIO CABINET — Construction details and bill of materials for the curio cabinet



BILL of MATERIALS

No. Req.	Name	Size
1	top	3/8 × 17 1/4 × 4 3/8
1	molding	3/8 × 16 3/4 × 1 3/4
1	Shelf A	3/8 × 4 15/16 × 16 1/2
1	Shelf B	3/8 × 3 3/8 × 16 1/2
1	Shelf C	3/8 × 3 3/8 × 16 1/2
1	bottom	3/8 × 5 5/16 × 17 5/16
2	sides	3/8 × 5 × 18 3/4
2	back panel	3/16 × 18 3/4 × 1 5/8
2	back panel	3/16 × 18 3/4 × 1 3/4
3	back panel	3/16 × 18 3/4 × 3 1/8
8	drawer (F) (B)	1/4 × 3 11/16 × 2
8	drawer (side)	1/4 × 3 7/16 × 4 7/16
4	drawer (bottom)	1/4 × 3 7/16 × 4 7/16
4	Knobs — 1 pc.	5/8 × 5/8 × 10

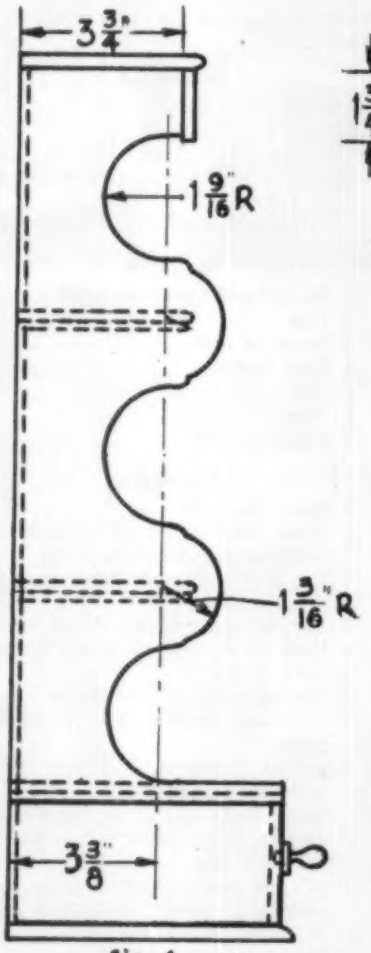


fig. 1

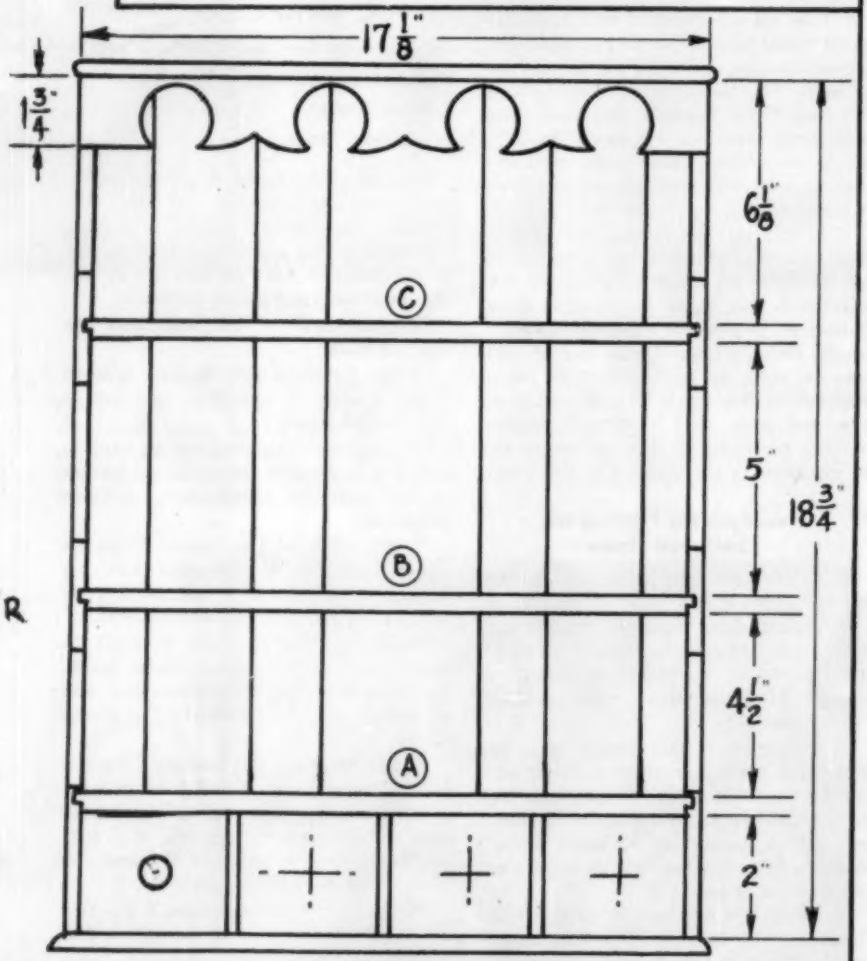
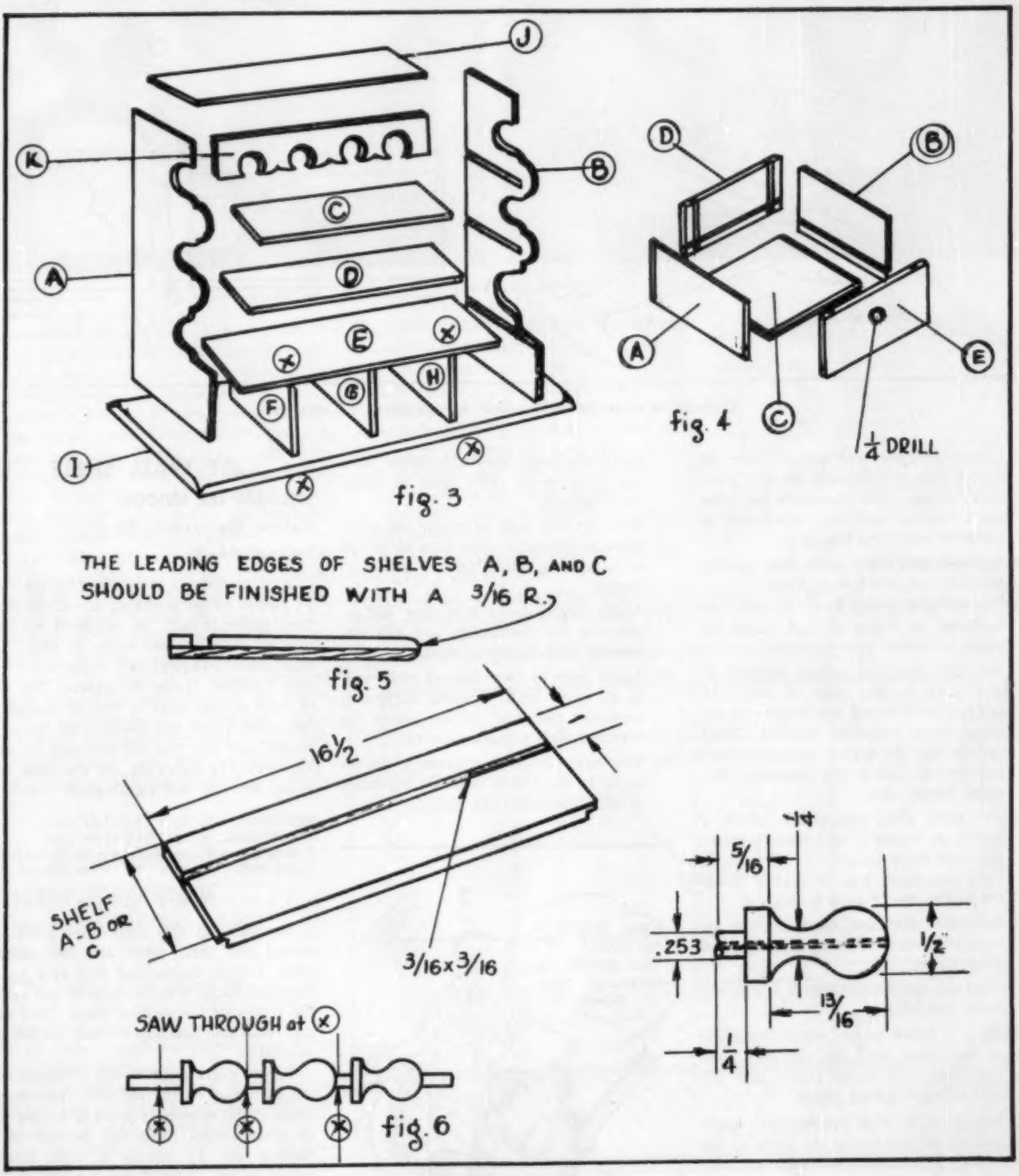
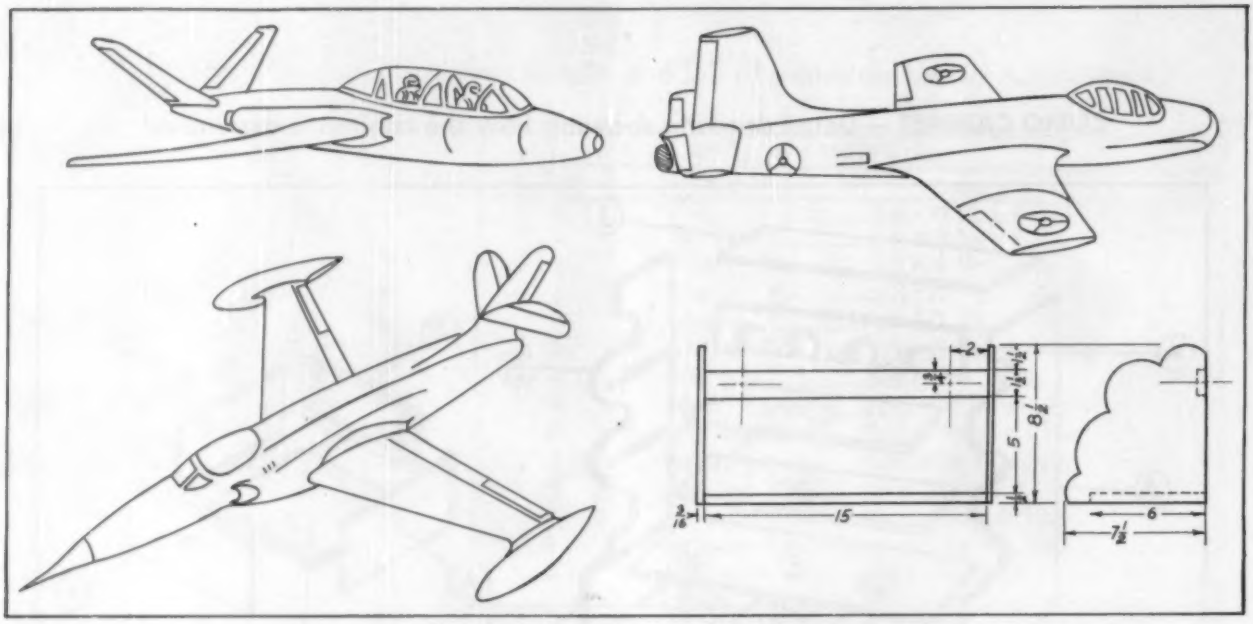


fig. 2

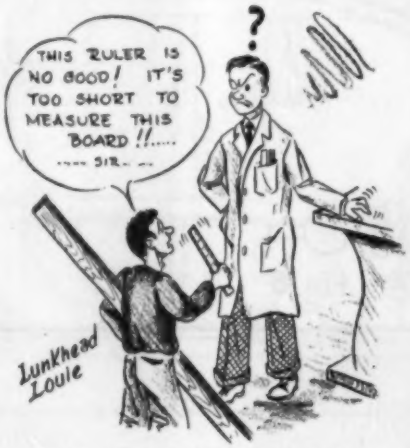
CURIO CABINET – Detail drawing showing how the cabinet is assembled





Details of the jet wall shelf by William L. Hodge

8. Clamp securely and scrape away all excess glue immediately. At this point make certain that allowance has been made for the back slats which will be inserted later. See Figure 2.
9. Lay out very light guide lines on the underside of piece E in Figure 3.
10. Set and glue pieces *F*, *G*, *H*, and *I* as indicated in Figure 3, and clamp securely.
11. Set the clamps at points marked *X*, and place a thin strip of wood on either side of clamp jaw to prevent the wood from becoming marked. Make certain that the drawer separators have not moved during this operation. Remove excess glue.
12. Assemble, glue, and clamp pieces *J* and *K* in Figure 3, and remove excess glue and allow to set.
13. Drill one ¼-in. hole in drawer fronts for knobs. See Figure 4, piece *E*.
14. Assemble, glue, and clamp drawer assemblies, wipe off excess glue, and allow to set.
15. Sand the complete unit with 2/0 garnet paper carefully.
16. Using a block plane, round the edges of the seven slats for the back, and sand with 2/0 garnet paper, and follow with 6/0 garnet paper.
17. Beginning with a narrow slat, insert them into position in the back of the cabinet alternately. Glue very carefully, allow to set and dry.
18. Sand the complete unit with 6/0 garnet paper. At this point due consideration must be given the knobs. A template should be made which will enable the builder to check the radius on the knob. The knobs should be turned from the 5/8 by 5/8 by 10-in. piece of stock. See Figure 6.
19. Wipe on one coat of maple oil stain, allow to penetrate, then wipe off excess with dry rag. Allow this to dry thoroughly.
20. Apply two coats of thin clear shellac, allow to dry thoroughly, and rub vigorously with fine steel wool.
21. Apply three to four coats of paste wax. In all cases, hard, vigorous rubbing is necessary. A good polish cannot be obtained with a quick easy rub.
22. The same finishing procedure should apply to the knobs, while in the lathe, prior to their removal.



Cartoon by Louis J. Enos, Lincoln Junior High School, Sacramento, Calif.

JET WALL SHELF

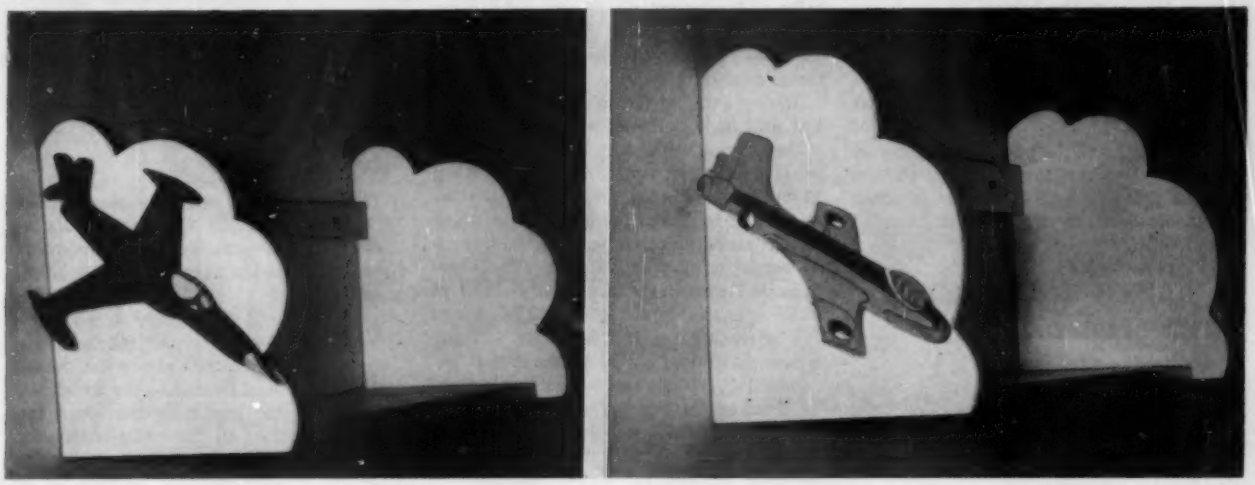
WILLIAM LEE HODGE
Palmer Elementary Shop
Springfield, Ill.

If your students are thrilled by the sleek jet planes we see streaking across our skies, they probably will be delighted to have this jet shelf in their rooms or dens. The shelf space measures 6 in. wide and 15 in. long (without clouds or planes). The idea of such a wall shelf is flexible enough so that almost any size cloud, shelf board or boards, and any type airplane may be used. However, the following are the sizes used in my seventh- and eighth-grade classes:

shelf piece	½	by 6	by 15-in. pine
support strip	½	by 1½	by 15-in. pine
2 cloud pieces	3/16	by 7½	by 8½-in. Upson board
2 jet planes	3/16	by 3	by 7½-in. Upson board, or
	3/16	by 5	by 7½-in. Upson board

To construct this shelf, first plane and square the shelf piece and the support strip. Locate, mark, and drill two 3/16 in. diameter holes, 2 in. from each end and in the center of the support piece. Sand each part with fine sandpaper; then shellac and varnish.

Trace or draw the clouds freehand, and cut them out on the jig saw; then enamel them. A flat enamel or paint looks the best on these clouds. Since one method of attaching the jet planes is with wooden blocks ½ by ½ by 2 in., it might be advisable to enamel these blocks at the same time as the clouds. The jet planes, original or traced, are then cut out on the jig saw. A wood burning tool is used to line in the detail of the aircraft, then paint with model airplane dope, tempera paint, or a



Jet wall shelf

combination of colors of both. Be sure to paint the edges of the planes and the backside of any part which may show after assembly (especially the nose).

When clouds, shelf piece, and support strip are dry, nail them together using 4 penny box nails. Touch up over the nails with the white paint. Then fasten the jet planes to the clouds. As mentioned previously, one way of mounting the planes is to use wooden blocks. Using fine (½ in. — 20 ga.) wire nails, nail the planes to the blocks and then nail to the cloud. Care should be taken that the tail of the plane doesn't protrude behind the cloud because this prevents mounting the shelf flush with the wall. Another quite novel method of mounting the planes is to mount them on piano wire. This method gives the planes a *3-D* appearance of suspension. When completed, this wall shelf will delight your air-minded boys and give satisfaction to the instructor who taught them how to do the job.

A SANDING BLOCK

GEORGE V. CARDINALE
Roosevelt Junior High School
Erie, Pa.

The sanding block shown here was constructed in our shop by the eighth- and ninth-grade pupils. This was the first project of the term and was chosen as such for the following reasons:

1. It provides a means of reviewing the proper use of basic hand tools with the minimum of waste due to errors.

a) Ten hand tools were used in its construction: (1) auger bit and brace; (2) jack plane; (3) screw driver; (4) try square; (5) 1-ft. rule; (6) countersink; (7) center punch; (8) claw hammer; (9) crosscut saw; (10) marking gauge.

2. It provides each boy with his own sanding block:

a) The pupil exercises more care because it is his own property.

3. It conserves sandpaper.

a) Prevents sandpaper from being torn; (*b*) enables all the sandpaper to be used since both halves of the sheet are used and the remaining piece is used after it has been removed from the sanding block;

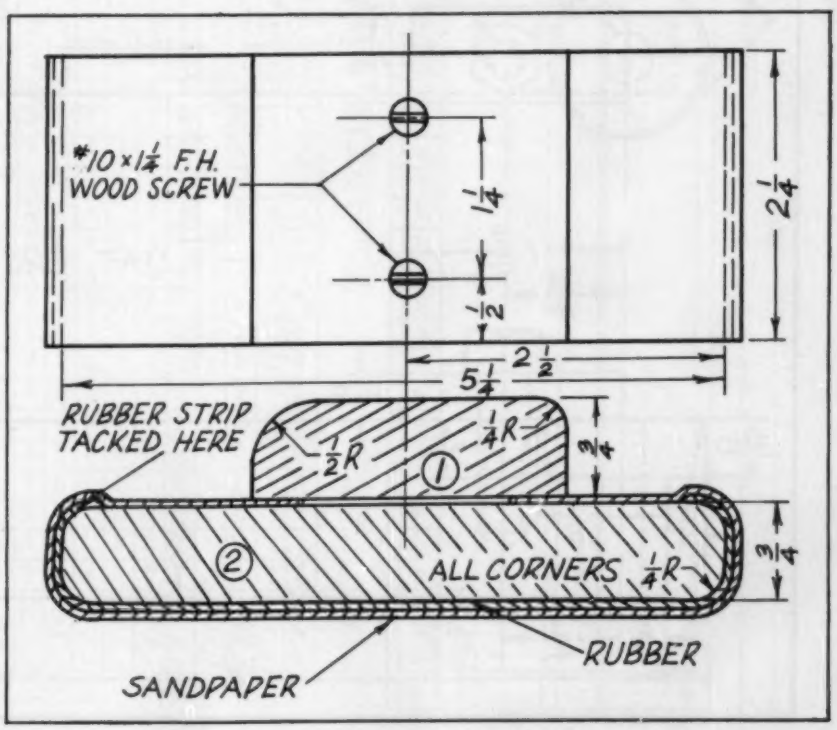
4. The pupils use three different grades of sandpaper and are asked to exchange blocks with each other.

a) This promotes the idea of co-operation among pupils.

The rubber for the sanding block is cut from discarded inner tubes which pupils bring to class. The inner tube strip is 2¼ in. in width and 6¼ in. in length. It

BILL OF MATERIALS

Pcs. required	*Part*	*Material*	*Size*
1	Pc. No. 2	Poplar or pine	¾ x 2¼ x 5¼ in.
1	Pc. No. 1	Poplar or pine	¾ x 2¼ x 2½ in.
1		Rubber strip	2¼ x 6¼ in.
½ sheet		Sandpaper 1/2 grade to 5/0 garnet	
4		Carpet tacks	
2		No. 10 f.h. wood screws 1¼ in.	



Details of the sanding block

is stretched over the bottom of the lower section of the sanding block (pc. No. 2) and tacked down. The upper section (pc. No. 1) holds the sandpaper taut and is attached to pc. No. 2 by two screws (1¼ in. No. 10 f.h.). The dimensions of the sanding block permit the full use of the length of the sandpaper and are of such a width that one half of a sheet of sandpaper folded in two may be used.

RADIUS TOOLHOLDER

ALFRED GRAYSHON
Machine Shop Instructor
Olney High School
Philadelphia, Pa.

Material Required

1 pc. CRS ½ by 1⅛ by 6 in.
1 pc. CRS 5/16 by ⅝ by 1⅜ in.
1 pc. TS 1 by 1 by ⅜ in.
1 pc. Drill rod 5/16 by 1 in. long
1 pc. Hex. Hd. Cap Screw 5/16 — 24 by 1 in.

Shank: Square one end and bevel the other end by filing or shaping. Lay out for holes and recess. Drill 19/64 in., and ream 5/16 in. for pin. Drill 17/64 in., and tap 5/16 in. — 24 for screw. Saw and file out the recess or mill to layout.

Strap: Cut and file square. Lay out for, and drill body hole 21/64 in.

Cutters: Cut disks. Lay out, center punch, drill 19/64 in., and ream 5/16 in. Mount on a mandrel and face both sides to .005-in. oversize. Turn the 8-deg. angle to size. Heat the cutter red hot and quench in hardening oil or harden, polish, and draw to light straw and then quench in water quench. Grind top face. The cutters can be released and moved around to bring a new sharp edge as the previous part becomes dull. The cutter can be resharpened by grinding the top surface slightly.

This holder can be used to hold other cutters having more radii or shapes, as finishing medium for various curved surfaces.

The Army, founded in 1775, is actually 14 years older than the United States itself and is the oldest military service, having fought in all of America's wars. — *Public Information Office.*

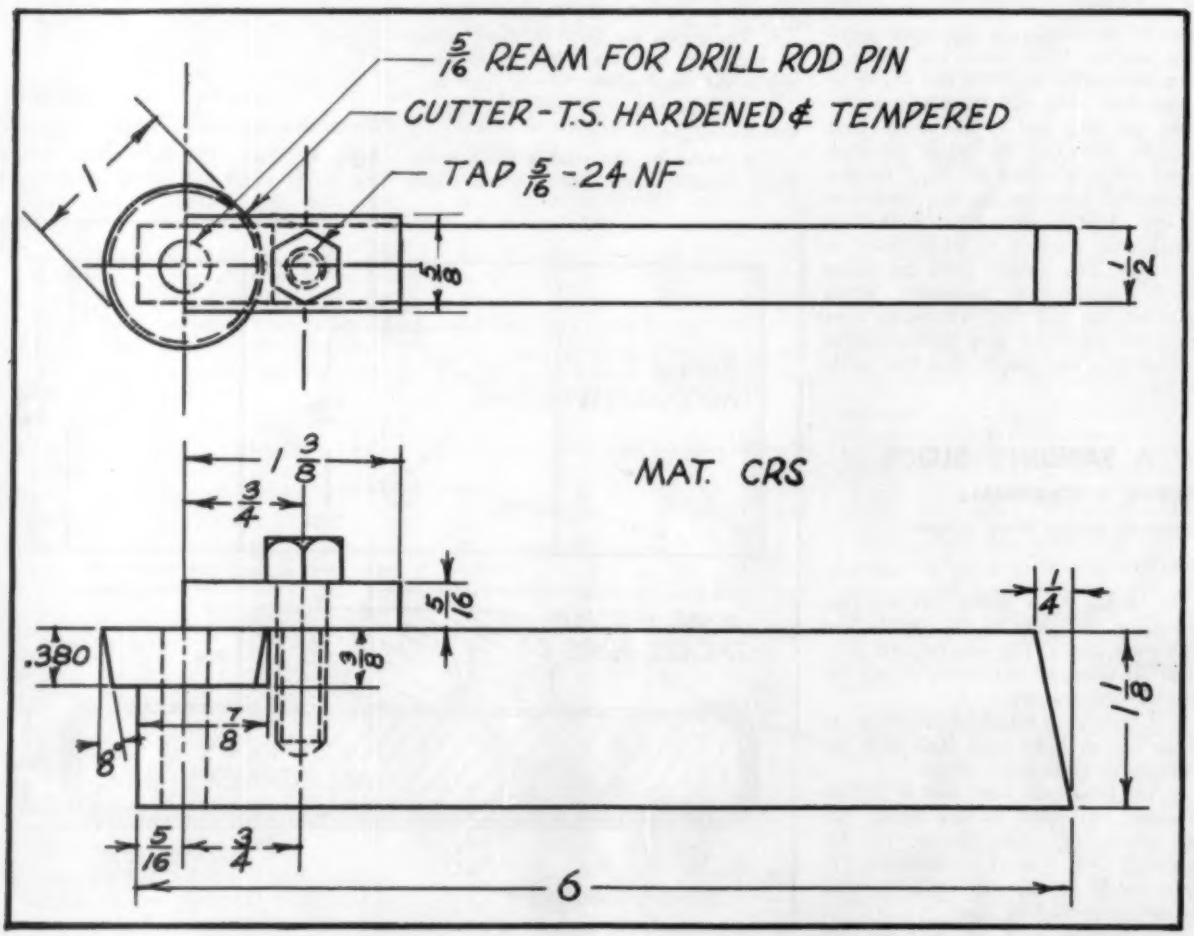
BOARD FEET CALCULATOR

V. E. Broadbent
Instructor, Santa Clara Union High School
San Jose, Calif.

This board feet calculator was devised as a time and brain saver in calculating the majority of sizes found in a woodwork project. In use the answer is found in one hundredths of a board foot by twirling either knob until the desired width shows along the top edge of the plastic guide. The answer is then seen above the desired length. Since it is figured to the hundredth multiples of the lengths or the board feet of several pieces of the same length can be accurately figured by simple multiplication. The answer can then be rounded off to the nearest tenth or whole number according to the user's wishes.

At first the writer relied on a large chart but this proved bulky and confusing to anyone cursed with bifocals. This improved model is an attractive addition to any desk and can easily be carried around.

It is best to make the cardboard chart



Details of the radius toolholder

BOARD FEET CALCULATOR

PAPER BOARD FEET TABLE

	24"																														
1"X1"	.01	.01	.02	.03	.03	.04	.05	.06	.06	.07	.08	.08	.09	.10	.10	.11	.12	.13	.13	.14	.15	.15	.16	.17	.17	.18	.19	.19	.20	.21	.22	.22	.23	.24	.24	.25
1"X2"	.01	.03	.04	.06	.07	.08	.10	.11	.13	.14	.15	.17	.18	.19	.21	.22	.24	.25	.26	.28	.29	.31	.32	.33	.35	.36	.38	.39	.40	.42	.43	.44	.46	.47	.49	.50
1"X3"	.02	.04	.06	.08	.10	.13	.15	.17	.19	.21	.23	.25	.27	.29	.31	.33	.35	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.63	.65	.67	.69	.71	.73	.75
1"X4"	.03	.06	.08	.11	.14	.17	.19	.22	.25	.28	.31	.33	.36	.39	.42	.44	.47	.50	.53	.56	.58	.61	.64	.67	.69	.72	.75	.78	.81	.83	.86	.89	.92	.95	.97	1.00
1"X5"	.03	.07	.10	.14	.17	.21	.24	.28	.31	.35	.38	.42	.45	.49	.52	.55	.59	.62	.66	.69	.73	.76	.80	.85	.87	.90	.94	.97	1.01	1.04	1.08	1.11	1.15	1.18	1.21	1.25
1"X6"	.04	.08	.12	.17	.21	.25	.29	.33	.37	.42	.46	.50	.54	.58	.63	.67	.71	.75	.79	.83	.88	.92	.96	1.00	1.04	1.08	1.13	1.17	1.21	1.25	1.29	1.33	1.38	1.42	1.46	1.50
1"X7"	.05	.10	.15	.19	.24	.29	.34	.39	.44	.49	.53	.58	.63	.68	.73	.78	.83	.88	.92	.97	1.03	1.07	1.12	1.17	1.21	1.26	1.31	1.36	1.41	1.46	1.51	1.56	1.60	1.65	1.70	1.75
1"X8"	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83	.89	.94	1.00	1.05	1.11	1.17	1.22	1.28	1.33	1.39	1.44	1.50	1.56	1.61	1.67	1.72	1.78	1.83	1.89	1.95	2.00
1"X9"	.06	.13	.19	.25	.31	.38	.44	.50	.56	.63	.69	.75	.81	.87	.94	1.00	1.06	1.13	1.19	1.25	1.31	1.38	1.44	1.50	1.56	1.63	1.69	1.75	1.81	1.88	1.94	2.00	2.06	2.13	2.19	2.25
1"X10"	.07	.14	.21	.28	.35	.42	.49	.56	.63	.69	.76	.83	.90	.97	1.04	1.11	1.18	1.25	1.32	1.39	1.46	1.53	1.60	1.68	1.74	1.81	1.88	1.95	2.02	2.08	2.16	2.22	2.29	2.36	2.43	2.50
1"X11"	.08	.15	.23	.31	.38	.46	.53	.61	.69	.76	.84	.92	.99	1.07	1.15	1.22	1.30	1.37	1.45	1.53	1.60	1.68	1.76	1.84	1.91	1.99	2.06	2.14	2.21	2.29	2.37	2.44	2.52	2.60	2.67	2.75
1"X12"	.08	.17	.25	.33	.42	.50	.58	.67	.75	.83	.92	1.00	1.08	1.17	1.25	1.33	1.42	1.50	1.58	1.67	1.75	1.83	1.92	2.00	2.08	2.17	2.25	2.33	2.42	2.50	2.58	2.67	2.75	2.83	2.92	3.00
1"X13"	.09	.18	.27	.36	.45	.54	.63	.72	.81	.90	.99	1.08	1.17	1.26	1.35	1.44	1.53	1.62	1.72	1.81	1.90	1.99	2.08	2.17	2.26	2.35	2.44	2.53	2.62	2.71	2.80	2.89	2.98	3.07	3.16	3.25
1"X14"	.10	.19	.29	.39	.49	.58	.68	.78	.87	.97	1.07	1.17	1.26	1.36	1.46	1.56	1.65	1.75	1.85	1.95	2.04	2.14	2.24	2.34	2.43	2.53	2.63	2.72	2.82	2.92	3.02	3.11	3.21	3.31	3.41	3.50
2"X2"	.03	.06	.08	.11	.14	.17	.19	.22	.25	.28	.31	.33	.36	.39	.42	.44	.47	.50	.53	.56	.58	.61	.64	.67	.69	.72	.75	.78	.81	.83	.86	.89	.92	.95	.97	1.00
3"X3"	.06	.13	.19	.25	.31	.38	.44	.50	.56	.63	.69	.75	.81	.88	.94	1.00	1.06	1.12	1.19	1.25	1.31	1.38	1.44	1.50	1.56	1.63	1.69	1.75	1.81	1.88	1.94	2.00	2.06	2.12	2.19	2.25

10"

1½" ⅝"

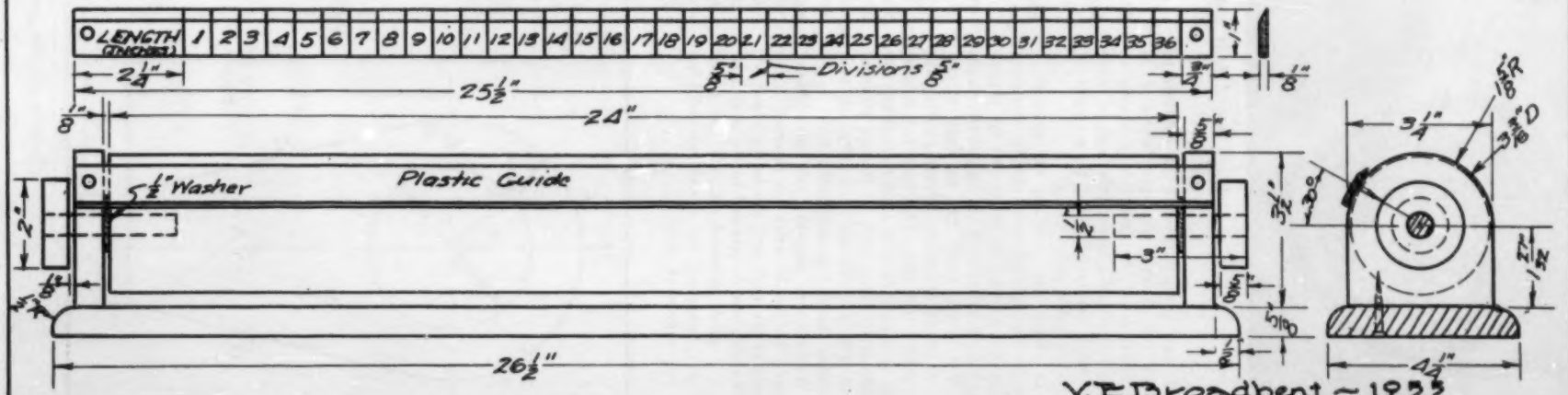
STOCK BILL

PARTS	No.	T."	W."	L."
Cylinder	1	3 3/16	3 3/16	24
Base	1	1/8	4 7/16	26½
Ends	2	1/8	3¼	3½
Dowels	2	½	½	3
Washers	2	⅛	Hole	½"
Knobs	2	⅛	2	2
Plastic Guide	1	⅛	1	25½
Base Screws	4	#8		1½
Guide "	2	#6		¾
Paper Chart	1		10	24

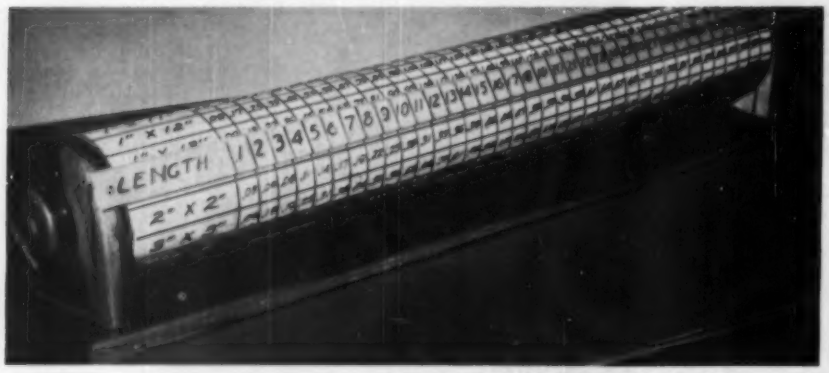
SUGGESTIONS:

1. Make chart first from tough, light cardboard.
2. Wrap chart around cylinder to check final diameter of cylinder.
3. Glue chart to cylinder, using heavy string or bent tin for clamping.
4. Bevel edge of plastic guide.
5. Etch lines and lengths on plastic guide with vibrotor tool, and ink in for greater visibility.

PLASTIC GUIDE



V.E. Broadbent ~ 1953



Board feet calculator

first, and wrap it around the cylinder to check the latter's diameter before it is removed from the lathe. If a saving in weight is desired, the cylinder can be made of heavy cardboard glued to a couple of round wooden ends.

In gluing the chart to the cylinder it can be held in place until dry by wrapping with heavy twine or better still by clamping a bent cylinder of tin around the chart.

The length guide can be very attractively made of yellow opaque plastic with a beveled top edge. The lines and lengths can be etched in with a sharp tool but are more easily done with an electric vibrator tool. The grooves are then inked in with drawing ink for greater visibility.

Washers are slipped over the cylinder dowels before the axles are inserted in the holes in the ends and the knobs glued on. Then the base is screwed to the ends, the plastic guide screwed on, and the whole project lacquered for a welcome addition to any woodwork shop.

POURING AID

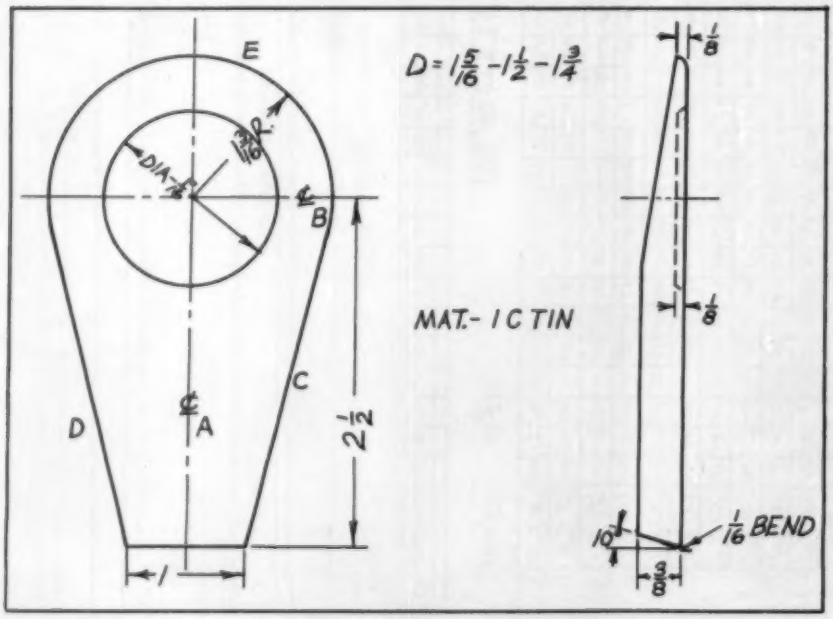
ALFRED GRAYSHON
Machine Shop Instructor
Olney High School
Philadelphia, Pa.

Almost every gallon or larger can or container for oil or other liquids has a screw type spout which causes waste and dripping when the contents is poured out.

The pouring aid shown here is an easy project made of IC tin plate. A piece of sheet tin 2½ by 4 in. is cut. Center line *A* is drawn down the center of the length of the piece, and center line *B* is drawn across $2\frac{9}{16}$ in. from one end. Using these center lines completes the layout.

Cut out the hole by lightly cutting with a narrow chisel and breaking out the disk. Cut the ouside edges of the layout. Bend over edges *C* and *D* at right angles. Using a metal block or end of steel bar $2\frac{5}{8}$ in. in diameter (with rounded edge), work the edge of the piece *E* over little by little, keeping it even to prevent cracking. Make $\frac{1}{16}$-in. right angle bend on 1-in. edge. Holding the piece on slightly rounded of a ½-in. bar, peen the edge of the hole over gradually. Dress raw edges with a fine file.

This pouring aid can be left on the can, when not in use, by swinging it in toward the can handle.



Details of the pouring aid

SEAT FOR OPEN FRAME WORKBENCHES

GEORGE V. CARDINALE
Woodworking Instructor
Roosevelt Junior High School
Erie, Pa.

Since most of the floor space in any shop is allotted to the machines, workbenches, cabinets, and other pieces of equipment, very little is left, ordinarily, on which to arrange seating for the entire shop class. There is not enough space for desks or benches on which pupils may sit. Therefore, pupils are required to stand at their work stations or to sit on their workbenches while the teacher checks the attendance, demonstrates, or makes announcements. Since the class is not comfortably seated, the time consumed for these important functions, must be limited to a period of not more than ten or fifteen minutes. Frequently this is not possible and the class is deprived of the full benefits of their shop and teacher.

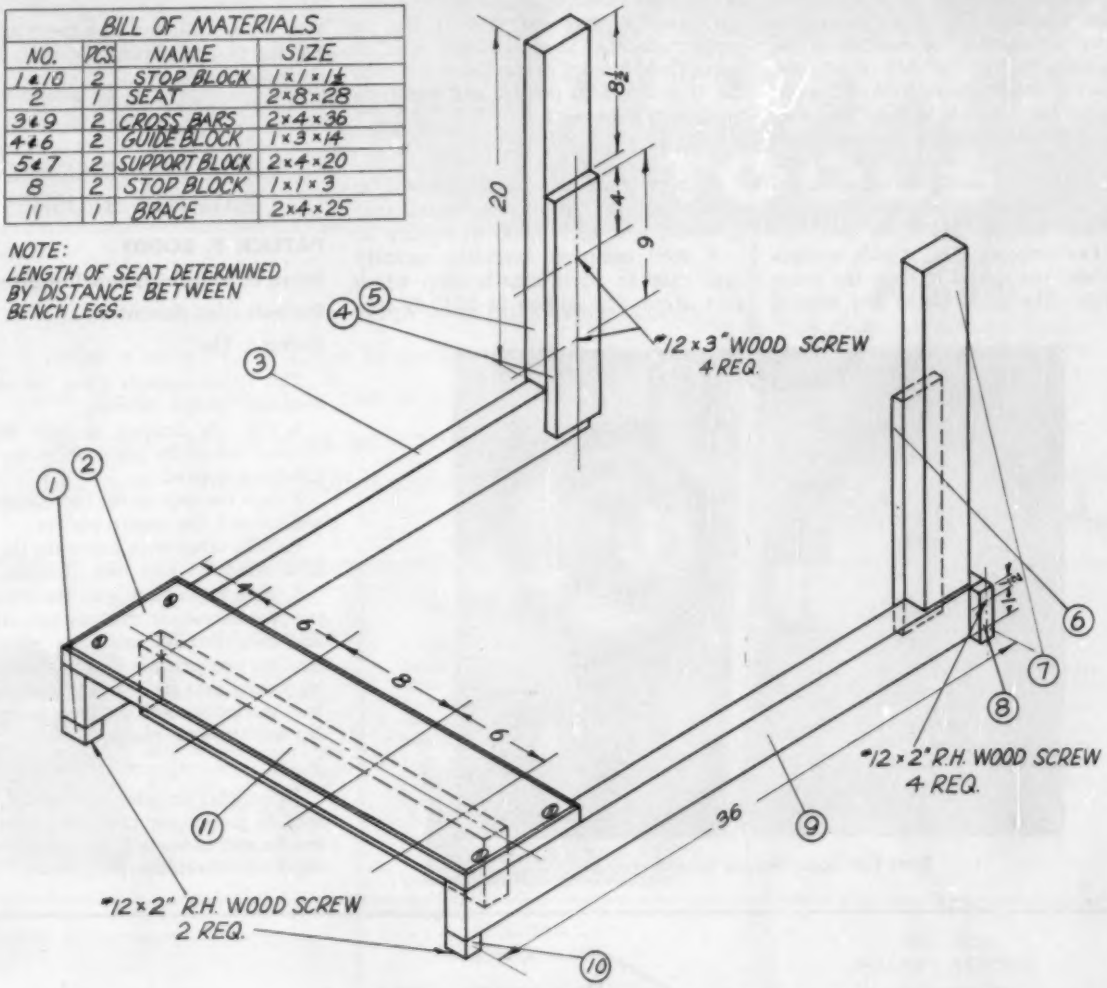
In shops where two open frame benches are clamped together and used in that manner, the seat shown may be used to a great advantage. The seat accommodates two pupils and is so constructed that pupils on the junior high school level may easily build it with materials commonly found in the woodworking shop. When the seat is not in use it may be pushed under, out of the way, and used as a shelf on which to place books, notebooks, and other articles.

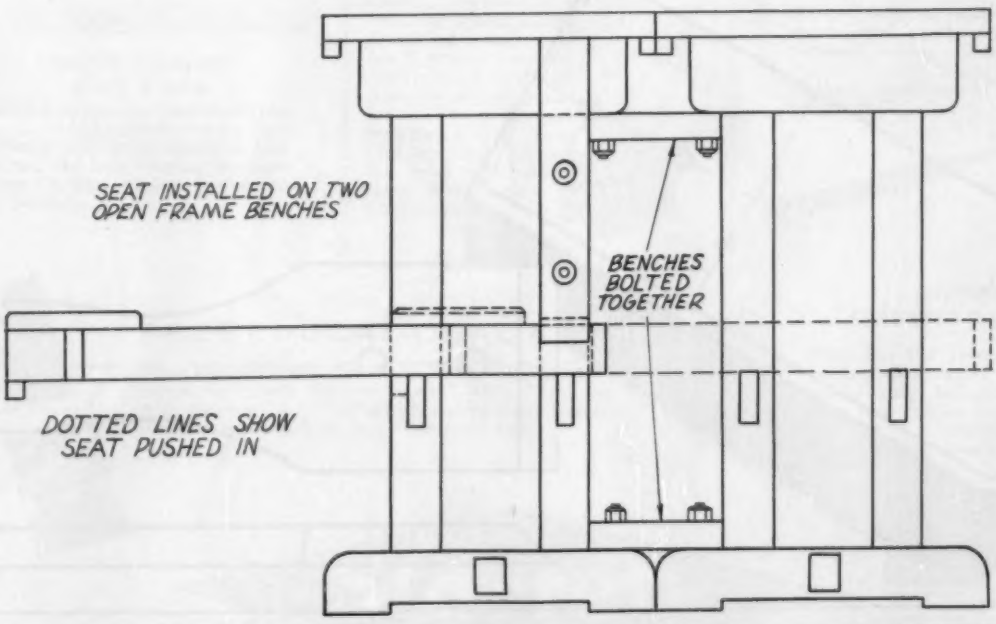
In our shop the seat was produced by the mass production method. Lumber for each bench was placed on each bench. One operation was performed on each piece by pupils assigned to complete just one operation. Pupils were assigned to each job according to the degree of difficulty. Seventh-grade pupils bored holes, sanded, and planed some of the pieces. Eighth graders sawed the various parts to length and planed them to width. They also installed wood screws. The ninth-grade pupils performed the layout work and the final assembly and finishing. By this method the benches were produced within a very short time and with the most satisfactory results. Interest in the project was very high and pupils completed their work enthusiastically.

The crossbars of the seat slide over the lower braces of the open frame bench.

BILL OF MATERIALS			
NO.	PCS.	NAME	SIZE
1&10	2	STOP BLOCK	1×1×1½
2	1	SEAT	2×8×28
3&9	2	CROSS BARS	2×4×36
4&6	2	GUIDE BLOCK	1×3×14
5&7	2	SUPPORT BLOCK	2×4×20
8	2	STOP BLOCK	1×1×3
11	1	BRACE	2×4×25

NOTE:
LENGTH OF SEAT DETERMINED BY DISTANCE BETWEEN BENCH LEGS.





Details of construction and bill of materials for seating on open frame workbenches

The front bench brace and the support blocks which fit under the top of the bench bear the weight of the seat. The support blocks are attached to the back leg of the bench with No. 12 by 3-in. r.h. wood screws. The same screws hold the guide blocks to the support blocks. The stop blocks are attached to the crossbars with No. 10 by 2-in. r.h. wood screws. These blocks prevent the seat from being pushed too far in or pulled too far out. The brace which fits directly under the seat (*2*) serves two purposes. First it adds strength to the seat and second it keeps the crossbars rigid. The guide blocks also help to keep the crossbars rigid. The main purpose of the guide blocks is to prevent the crossbars from slipping out from under the support blocks. The stop blocks come in contact with the leg of the bench and with the front brace to prevent the seat from being pulled out too far.

Seat for open frame workbenches

A blast furnace cost $2,014,000 in 1943. Last year it was estimated that it would cost $5,120,000 to replace it.

A steel company executive recently said that an open hearth shop which cost about $10 million in 1930 is estimated to cost about $64 million today. After allowing for its greater output, the cost is still over 4½ times as much, per ton of capacity, as the 1930 facility. — *Steel Facts*

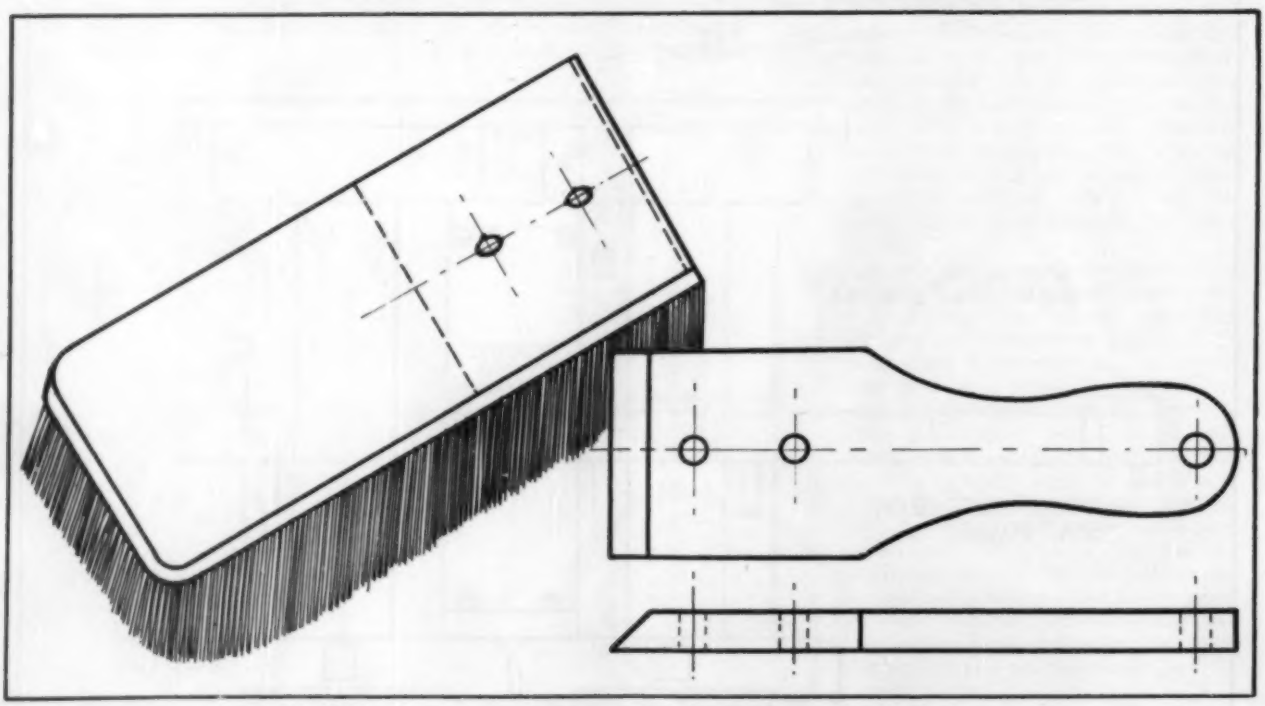
A USE FOR DISCARDED JANITOR BRUSHES

PATRICK F. BODDY
Head of Industrial Arts Department
Dalhart High School
Dalhart, Tex.

This article suggests a way for using old discarded janitor brushes.

1. Cut the brushes in half with the circular saw at the place where the handle had been inserted.
2. Saw the ends of the two pieces square and discard the center portion.
3. Take scrap stock and make the handle of a design to your own choosing.
4. Attach the handle to the brush with two woodscrews. In this way you can make fine shop brushes and save money too. Another suggestion is to split these brushes lengthwise into six separate pieces and retrim the bristles and use them in the drafting and drawing rooms.

In another decade, forecasters say, 67 million passenger cars and 14 million trucks and buses will be using the highways. — *Petroleum Newsnotes.*



A suggestion on how to make use of discarded janitor brushes

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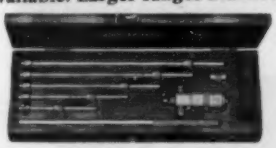
Capacity 2–8 inches. Set includes Satin Chrome micrometer head with ½ inch movement, measuring rods, spacing gage and spanner wrench. Auxiliary handle also available. Larger ranges available.



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ASSOCIATION NEWS

(Continued from page 6A)

WISCONSIN INDUSTRIAL ARTS ASSOCIATION

The annual meeting of the Wisconsin Industrial Arts Association was held at the Public Museum Lecture Hall in Milwaukee on Thursday, November 1, 1956.

W. C. Bohnsack, president, was chairman at this meeting.

The main address was given by Robert T. DeVore of Chicago, who titled his talk "Only the Productive Make Progress."

He emphasized that our country is great because its people work and plan together and produce more than others.

Industry, agriculture, engineers, scientists, financiers, employers, and employees, when working together, are the cause of our progress.

We progress because we strive to improve the tools and machines we use, not by taxing our muscles, but rather our minds.

An auto of today, made at the cost of labor and with the tools used years ago to build our earlier cars, would cost $65,000.

One of the plastic materials now commonly used cost 80 million dollars per pound before it became commercially successful.

Roy Radtke, president of the American Industrial Arts Association, announced that his organization will elect an executive secretary who will be stationed at the N.E.A. office in Washington. Efforts will also be made to have an industrial arts supervisor in every state.

The new officers elected for next year are: President, Harry Oldstedt; vice-president, Geo. Jackson; and committeeman-at-large, Arnie Gerhard.

The retiring president, W. C. Bohnsack, was decorated with the usual past president's pin.

The drawing of the prizes, donated by the manufacturers and dealers of industrial arts and vocational education equipment, tools, and supplies, followed.

OFFICERS ELECTED FOR 1957

The Indiana Council of Administrators of Vocational Education and Practical Arts, in a two-day conference at South Bend, elected officers for the year 1957: president, A. Lester Cunningham, supervisor of adult and vocational education, Gary Public Schools; vice-president, Edgar Stahl, director of vocational education, New Albany; and secretary-treasurer, Richard Hamilton, director of vocational education, New Castle, Ind.

The Indiana Council of Administrators is affiliated with the National Council. It is organized to develop in-service training for teachers of industrial education, and to promote legislation to increase the effectiveness of vocational education on a local, state, and national basis.

LOS ANGELES COUNTY INDUSTRIAL EDUCATION ASSOCIATION

Over 200 Los Angeles County shop instructors met at Paramount Junior High School, October 15, 1956, for their first dinner meeting of the 1956–1957 school year.

Ted Knudson, president, introduced the head table which included Lee Ralston and David O. Taxis, and after-dinner speaker, Wesley P. Smith, director of vocational education for the state of California.

After a report by George Schneider on the industrial arts scholarship committee which was just recently established to interest young men in careers of industrial-arts education, the ever popular "Quickies" were presented. Len Falloon and Earl Wilbert of Rosemead High School, and Don Norvold and John Switzer of Arcadia High School presented short demonstrations of a teaching aid, project, and other helpful hints which drew the applause and interest of all in attendance.

Mr. Smith, during his very informative talk, stressed the importance of the industrial-arts program as an aid in providing the much needed technical force now in demand. "Jobs yet to be created by our fast-moving industrial economy will find industry looking to us and we must meet this need," stated Mr. Smith.

The next dinner meeting — a Do-It-Yourself evening — was held at Wilson Junior High School in Glendale, Calif., on December 7, at 6:30 p.m. The subject centered around the silk screen process of printing.

— Fred Sherwyn, publicity chairman.

INDUSTRIAL-ARTS TEACHERS MEET

Industrial-arts teachers from the Tennessee-Kentucky colleges assembled at Middle Tennessee State College, Murfreesboro, Tenn., on October 26 and 27, 1956, for an in-service discussion of current problems incident to better work in the field of teaching industrial arts.

Those in attendance were: John W. Porter, Richard Gannaway, and Leon Bibb, from Austin Peay College; W. B. Clark and Joe Moore, Tennessee Polytechnic Institute; Benjamin C. Tinnell, George S. Roe, and Glenn C. Jordan, Eastern Tennessee State College; Thomas E. Myers, Willard E. Swinford, Dave R. Patrick, John Rowlett, Ralph W. Whalin, and J. Homer Davis, Eastern Kentucky State; Walter Nalbach, H. B. Clark, and L. G. Smith, Western Kentucky State; Philip H. Dalton, James H.

(Continued on page 18A)

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There were 41 of these exhibits throughout the country last year . . . *all highly successful.* Known as Student Craftsmen's Fairs, they served as local "showcases" for school projects entered in Ford's nationwide Industrial Arts Awards Program.

IAA is growing fast. Last year, under supervision of enthusiastic Industrial Arts teachers countrywide, over 35,000 students competed for coast-to-coast recognition, hundreds of cash prizes, and exciting all-expense trips to Detroit.

For full details regarding the 1957 program, for rules and entry blanks, and for ideas that will help you hold a Student Craftsmen's Fair in *your* locale, address your request to Ford Industrial Arts Awards, Ford Motor Company, The American Road, Dearborn, Michigan.

FORD INDUSTRIAL ARTS AWARDS

INDUSTRIAL ARTS AWARDS
FORD MOTOR COMPANY

ASSOCIATION NEWS

(Continued from page 16A)

Gonce, John S. Wade, Jr., Harold Jewell, Neil G. Ellis, and O. L. Freeman, Middle Tennessee State; Paul Lynn, R. J. Baird, G. L. Lilly, and Hugh L. Oakley, Murray State; L. L. Gore, Peabody College; Norman N. Roberts and J. T. Mays, Morehead State College; and L. C. McDowell, department of education, Frankfort, Ky.; and Nelson Grote, department of education, Frankfort, Ky.

FLORIDA INDUSTRIAL ARTS ASSOCIATION

The Florida Industrial Arts Association announces the election of the following officers for 1956–1957: president, Bernie Kurland, Miami; secretary-treasurer, Dave Richards, Fort Myers; district vice-presidents, Leon Lennertz, Jacksonville, Dean Ritchie, Lakeland, William Lewis, Miami, Del Rheel, Fort Myers, and Charles Deal, Panama City; publicity, Charles Cumbo, Tampa; consultant, Dr. Edwin Kurth, state department, Tallahassee; and teacher training, Professor J. R. McElhenny, University of Miami, Coral Gables, Florida.

The state of Florida has geographic problems of widely separated major cities and educational centers, and these distances have in the past prevented successful statewide Association meetings where attendance reflected the actual number of industrial-arts people employed in the State. This year, in co-operation with the State Department (Florida) of Education through Dr. Edwin Kurth, state consultant for industrial arts, the Florida General Extension Division, and the Florida Industrial Arts Association, the distance barriers are being overcome by holding "district" meetings in various sections of the state. These meetings include demonstrations of shop and graphic techniques, discussion of common problems, and co-ordinating reports by the state consultant. — *Bernie Kurland, President.*

MINNESOTA VOCATIONAL ASSOCIATION

The Minnesota Vocational Association held their annual convention in Minneapolis, Minn., on October 26. New officers elected for the year 1956–1957 are: president, Robert M. Worthington, vocational division, St. Paul; vice-president, Dr. Ruth Palmer, head, home-economics department, University of Minnesota, Duluth Branch, Duluth; secretary-treasurer, Dean Turner, principal, Southern School of Agriculture, Waseca, Minn.; and president-elect, Vernon R. Maack, vocational co-ordinator, Alexandria, Minn.

NEWLY FORMED GROUP HOLDS FIRST MEETING

The first meeting of the year for the newly formed Southeastern Industrial Education Association was held in Ann Arbor, Mich., on October 21. Dewey Barich, educational consultant for the Ford Motor Company, addressed the group on the subject, "Challenging the Superior Student Through Industrial Arts."

Plans are being made for a winter meeting, to be held at Lincoln Consolidated School in Ypsilanti. Discussion will center around the future in industrial education, in the fields of teacher training, instructional materials, and tools and equipment.

This organization, now in its first full year of operation, is looking forward to fullfilling its main objective: providing professional associations on the local level for those persons interested in making a contribution to industrial education.

If anyone is interested in participating in the next meeting, or wishes to affiliate with the organization, he may contact any of the following officers: Howard Gerrish, Ann Arbor, president; Harvey Kulibert, Ann Arbor, vice-president; Rudolph Albert, Ypsilanti, treasurer; Oliver Swain, Ida, secretary; Rex Riley, Morenci, director; Richard Ruppel, Napolion, director; Ben Werner, Monroe, director; Lee Smalley, Ypsilanti, director.

NORTH DAKOTA EDUCATIONAL ASSOCIATION

Robert Worthington of the Minnesota State Department of Education, addressed the Industrial Arts Section of the North Dakota Educational Association at its recent meeting on the campus of the University of North Dakota.

This year's attendance showed the largest number of participants ever assembled in North Dakota for an industrial-arts meeting.

Personal News

FACULTY MEMBERS AT SAN JOSE STATE COLLEGE

Dr. H. A. Sotzin, who was on sabbatical leave from San Jose State College, San Jose, Calif., during the 1955–56 academic year, has returned to his duties after a 25,000 mile trip which included 24 states in this country and 13 countries in Europe, the British Isles, and Scandinavia.

Dr. Wayne Champion, an assistant professor of industrial arts and education, at San Jose State College, was awarded the

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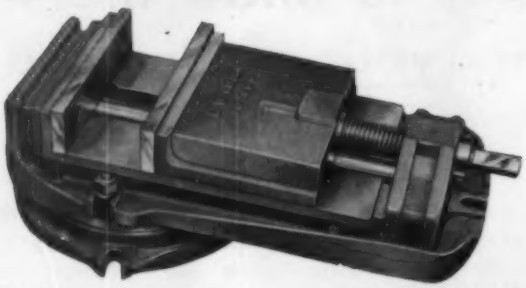

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doctorate of education degree by Stanford University in June, 1956. His thesis topic was "Exploration in Curriculum for Applied Arts Design." Dr. Champion has also been awarded a Fulbright fellowship and is spending this academic year in Europe. In addition he has been promoted to an associate professorship.

The following men have been added to the teaching staff:

Robert E. Buxton — assistant professor. B.S., 1939, M.S., 1948, Oregon State College; advanced graduate study, University of Maryland, 1954–55; high school industrial-arts instructor. Assistant professor, Oregon State College; associate professor, State Teachers College, Millersville, Pa., 1955–56.

Joseph M. Campbell — instructor (lecturer); sabbatical leave replacement for Dr. Wayne Champion; previously employed on part-time basis.

Parnik B. Hazarian — assistant professor. B.S., 1949, M.S., 1955, Stout State College, Menomonie, Wis.; printing instructor, Muscatine Iowa High School, 1949–56.

Alvin R. Lappin — assistant professor. A.B., 1939, Santa Barbara College; M.Ed., 1951, Wayne University; advanced graduate study, Wayne University, 1951–52; assistant chairman, department of industrial arts, Detroit University School, Mich.; special instructor, Wayne University, Detroit, Mich.; supervisor, Patient's Industrial Workshop, Veterans Administration, San Fernando, Calif.; assistant professor, Los Angeles State College, 1954–56.

Leslie E. Stephenson — assistant professor. B.S., 1947; M.S., 1949, Oklahoma A. & M. College; advanced graduate study, Ohio State University, 1954–56. Draftsman and surveyor, U. S. Army Ordnance Corps; instructor, Oklahoma A. & M. College; instructor, Ohio State University, 1955–56.

NEW STAFF MEMBERS NAMED

Mrs. Claire Glasser has joined the staff of the department of vocational education of the School of Education of New York University. She received her bachelor of science degree in occupational therapy at Columbia University in 1949. Her professional experience includes being director of occupational therapy at the New York Hospital; occupational therapist at Bellevue Hospital; and director of occupational therapy, New Haven Curative Workshop. Mrs. Glasser will now be in charge of the Textile Shop and will teach some occupational therapy courses.

John Douksza has joined the staff of the department of vocational education of the School of Education of New York University. Mr. Douksza received both his bachelor of science and master of art's degrees from New York University. His professional experience includes teaching at the Uniondale High School, Uniondale, Long Island; Bloomfield Senior High School, Bloomfield, N. J.; and at the Adult Education Center, Butler, N. J. Mr. Douksza will now teach mechanical drawing, essentials of art, and industrial-arts design.

SPECIALIST IN FLUID MECHANICS

Dr. Peter Chiarulli has been appointed chairman of the department of mechanics at Illinois Institute of Technology, Chicago. The announcement was made by Dr. Ralph G. Owens, dean of IIT's engineering division. Dr. Chiarulli comes to Illinois Tech from the National Bureau of Standards where he has been working on the dynamics of two-phase flows and shock theory.

Previous to joining the National Bureau of Standards, Dr. Chiarulli was an associate professor in applied mathematics at Brown University and an assistant professor of mathematics at Carnegie Institute of Technology. He holds a bachelor of arts degree from Brooklyn College, and he earned his master's and doctor's degrees at Brown University.

A member of honorary fraternities, Sigma Xi and Pi Mu Epsilon, Dr. Chiarulli also belongs to the Society for Industrial and Applied Mathematics.

NEW STAFF MEMBERS ADDED

The Industrial Arts Division of State University of New York Teachers College, Oswego, N. Y., has added five new faculty members to their staff this fall. The new faculty will work in several areas of the industrial-arts programs. They are:

Paul W. DeVore, assistant professor, formerly a teacher in Grove City College, Pa., and Chagrin Falls High School, Ohio.

Miss Elizabeth Hunt, assistant professor of elementary industrial arts, formerly a teacher in the junior and senior high schools in North Carolina, and also consultant in elementary industrial arts for 26 city schools in Charlotte.

Charles E. Shoemaker, assistant professor, who comes from a teaching position at the University of Maryland.

Donald Shutts, associate professor of industrial arts, who has a teaching background in electricity, industrial arts, and electronics, and was a member of the Faculty Senate of the State University of New York.

Warren Smeltzer, assistant professor, who has been teaching graphic arts at Allentown High School, and comes to Oswego from a dual position as teacher in Hyattsville High School, and critic teacher for the University of Maryland.

♦ Louis M. Sasman, formerly a vocational education specialist, United States of America Operations Mission to Egypt, International Cooperation Administration, is now with the State Board of Vocational and Adult Education, Madison, Wis.

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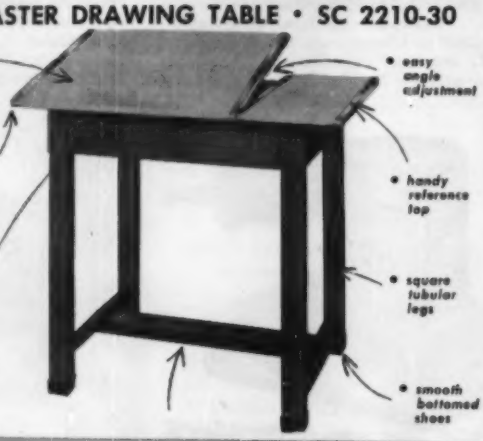

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Instructive, practical, interesting. Builds any one of 10 projects: broadcast receiver, amplifier, code practice oscillator, wireless "broadcaster," wireless phono oscillator, signal tracer, electronic timer or switch, 2 types of electronic relays. Students just change wiring for each project. With all parts, tubes and instruction manual. Shpg. wt., 10 lbs.

Model 83 Y 265. Only . **$12.65**

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"RANGER II" AC-DC RADIO KIT

Popular 5-tube superhet radio receiver kit. Thousands now used in shop training; teaches practical radio construction. It's a commercial quality broadcast receiver when completed. Kit includes tubes, preformed chassis, speaker, loop antenna, all parts, hardware and "Step-and-Chek" instructions. 8 lbs.

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Low-cost 38-range VOM. Features 4½" meter; 1% precision resistors. Ranges: AC, DC and output volts, 0-5000 in 7 ranges; Resistance, 0-1 meg. in 3 ranges; DC ma, 0-1 amp in 4 ranges; Decibels, —20 to +69. Black bakelite case, 6¾ x 5¼ x 4¼". Easy to assemble. With battery and test leads. 2½ lbs.

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Specialists in Electronic Supply for Schools

News Notes

SAFETY SURVEY OF BALTIMORE COUNTY SCHOOL SHOPS

During the week of October 8, 1956, some 68 school shops in various high schools in Baltimore County, Md., underwent a detailed safety inspection in co-operation with the Safety Engineering Club of Baltimore and the Baltimore Safety Council.

Thirty-eight safety engineers and personnel representing industry and business in Baltimore City and Baltimore County made the safety inspections.

Safety planners shown here are preparing for a survey of Baltimore county's public-school shop safety practices.

Left to right: Earl W. Smith, Baltimore Safety Council; Ben P. Dykman, Mutual Chemical Company; Arthur A. Dick, county school supervisor of vocational education; Harry A. Veditz, committee chairman, Maryland Casualty Company; and Charles Smickle, Black and Decker Company

The inspection report includes the areas of responsibility for safety, general physical conditions within the shop, quality of housekeeping, machinery and equipment, electrical equipment, personal protection, personal action, safety instruction, first aid, materials available, accident records and accident investigations. The board of education representative summarized the results and recommendations of the inspections and gave a written report to the central committee.

The central committee included Harry A. Veditz, chairman, representing the Maryland Casualty Company, Ben P. Dykman of the Mutual Chemical Company, Charles Smickle of Black & Decker, Earl W. Smith, Baltimore Safety Council, and Arthur A. Dick, supervisor of vocational education, Board of Education representative.

Some of the outcomes from this survey are written safety recommendations from experts in the field resulting in up-to-date school shop safety practices.

FIFTH ANNUAL PHOTOGRAPHY WORKSHOP

The Fifth Annual Tucson High Schools Photography Workshop will be held Friday evening and Saturday, February 15 and 16, 1957, at the Tucson (Arizona) High School.

The workshop is sponsored by all the Graphic Arts departments of all the local high schools, the Graflex Corporation, and the Tucson Daily Citizen. This Fifth Annual Workshop promises to be the biggest and best ever held. Highlights will be talks and demonstrations by Jack Swanburg, Heiland Corporation; Gene Johnson, Eastman Kodak Company; Andrew Foster, Graflex Corporation; and Ruth and Harry Crockett, world famous bird photographers.

(Continued on page 22A)

TEACHING AID

use a Rotolite to improve drawing techniques

With a low cost ROTOLITE PRINTER in your classroom, you can demonstrate in seconds what otherwise takes hours to explain. For example, you can use two hardnesses of pencil on a drawing, run the drawing through the ROTOLITE, develop it and *prove* which lines reproduce best.

Let your students run their own drawings through the ROTOLITE. There's no surer way to teach the need for proper tracing mediums and the right weight of line than to have students make prints of their own drawings. You will also find it an effective way to teach the principles of print-making.

The ROTOLITE was developed by Post to occupy a minimum of space so it can be quickly mounted on a wall or placed conveniently on table or desk. A patented rotary contact assembly permits the use of a standard fluorescent tube, which is the only light necessary for exposure. *No special training* is needed to install a ROTOLITE or to operate it. Complete, easy to follow directions are included. The ROTOLITE is a simple, inexpensive and dependable print-making machine for classroom use.* An 18″ machine with developing tube is only $129.50.

** Write to the Educational Sales Department, Frederick Post Company for literature and additional ROTOLITE information. If you are interested in more advanced equipment such as the larger Peck & Harvey machines we will be happy to supply full information on request.*

POST

FREDERICK POST COMPANY

3648 N. Avondale Ave., Chicago 18, Illinois

FREE BOOKLET on how to use intermediates

Your free copy of "11 WAYS TO SAVE DRAFTING TIME" contains helpful hints about intermediates you can pass on to your students. Use this 16-page booklet to show how modern drafting room techniques overcome costly retracing time in changing drawings. This is the first time these eleven tips have been gathered into one booklet.

Write today for your free copy of "11 WAYS TO SAVE DRAFTING TIME".

An intermediate is any translucent master print made from an original drawing. Modifications are made on the intermediate which is then used for print-making. The original drawing remains untouched.

NEWS NOTES

(Continued from page 20A)

The public will have an opportunity to view the latest photographic equipment and cameras, to speak to sales representatives of the local photographic shops, and the following organizations: Leica, Heiland, Graflex, Du Pont, Ansco, Eastman Kodak, Kling and Hornstein.

Admission is free; for further information write to Harry A. Goldstein, A.P.S.A., Graphic Arts Department, Tucson High School, Tucson, Ariz.

BIBLIOGRAPHY OF TEACHING AIDS

The 1956–57 Bibliography of Teaching Aids on America's forests and forest industries has been made available to the schools of the United States by the nation's forest industries. Men of the lumber, paper, pulp, plywood and other forest industries feel deeply that every American should learn to value his forest heritage and should see that this wonderful renewable resource is used wisely.

It is their hope that all who drive through the woods or stop to picnic, hike, hunt, or fish will understand the need for caution with fire. They also want everyone to recognize and appreciate sound forest practices, such as scientific harvesting which enables nature to reseed the land; the plowing of fire lanes as a protection against wildfire; and the planting of seedlings by hand and machine.

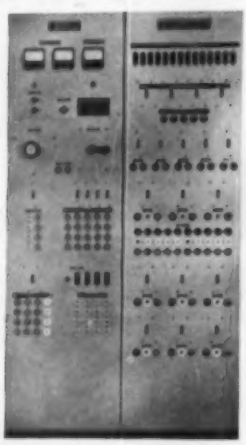
The bibliography is published annually and is available from *American Forest Products Industries, Inc., 1816 N Street, N.W., Washington 6, D. C.*

NOW — you should have our NEW Booklet...

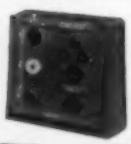
ELECTRIC SUPPLY & DISTRIBUTION FOR HIGH SCHOOL ELECTRIC SHOPS

You should have Publication No. 244 . . . *especially* if you are planning a new shop or re-vamping your present one. This booklet gives valuable suggestions; offers a shop layout plan and lists fundamental requirements.

SAFE, TIMESAVING, UP-TO-THE-MINUTE EQUIPMENT



DISTRIBUTION SWITCHBOARD
This controls and distributes all the various a-c and d-c currents required for any work in the Electric Shop.



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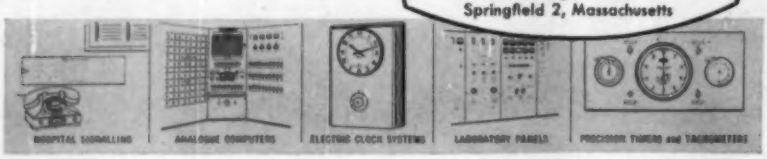

PHOTOGRAPHY CONTEST ANNOUNCED

Scholastic Magazines and Ansco, Inc., announce the 1957 Scholastic-Ansco Photography Awards competition among junior and senior high school students. More than 30,000 entries were received in the 1956 contest. The National Association of Secondary-School Principals has placed this competition, jointly sponsored by Scholastic Magazines and Ansco, on the Approved List of National Contests and Activities for 1956–57.

All junior and senior high school students in the United States and its territories are eligible to enter. There are four divisions — Division I, black and white, for students in the 7th through 9th grades; Division II, black and white, for students in the 10th through 12th grades; Division III, color transparencies, open to all junior-senior high school grades; and Division IV, snapshots, for students in the 7th through 9th grades. All entries must be in by March 15, 1957.

A rules booklet containing full information is available without charge at Ansco dealers or by writing to *Scholastic-Ansco Photography Awards, 33 West 42nd St., New York 36, N. Y.*

NEW STATE COMMITTEE ORGANIZED

A state committee on Industrial Arts Teacher Education for the State of Iowa was organized October 26, 1956. This is a new committee and its purpose is to coordinate the efforts of the Iowa degree-granting institutions in the field of industrial arts teacher education.

This organizational meeting was held on the Westmar College campus at LeMars. Those in attendance at this meeting were: Lowell Carver and Merle Wiener, Iowa State College; Eldon Danne, Westmar College; and Lawrence Wright and Howard Reed, Iowa State Teachers College.

Officers elected: secretary, Merle Wiener; and chairman, Howard Reed.

Among other problems under consideration, plans were discussed with respect to the joint publication of a recruitment folder for the profession of teaching industrial arts.

The next meeting of this committee will be held in Fort Dodge, Iowa, on January 15, 1957. — *Howard O. Reed, chairman.*

NEW BULLETIN ON HOUSE PAINTS

What the homeowner needs to know about house paints in order to select the right type for his purpose is told in a new popular publication of the U. S. Department of Agriculture, Home and Garden Bulletin No. 52.

The new bulletin entitled "Wood Siding: How to Install It, Paint It, Care for It," was prepared by the U. S. Forest Products Laboratory, which is maintained at Madison, Wis., by the Department's Forest Service.

The bulletin groups the hundreds of kinds of house paints on the market into six general types. They are described in terms that enable the homeowner to tell what type he is buying from the formula printed on the paint-can label. The advantages and limitations of each type are described, so that the homeowner can decide which type best meets his needs.

A single copy can be obtained from the *U. S. Department of Agriculture, Washington 25, D. C.*

♦ The University of Illinois Small Homes Council will conduct its 12th annual Short Course in Residential Construction, January 16 and 17, 1957. The two-day session is conducted annually on the University campus for builders, architects, contractors, and other persons in fields allied to the building industry.

(Continued on page 24A)

McKNIGHT PRACTICAL SHOP BOOKS

Profusely illustrated, easy to read and understand

#1 General Shop
BENCH WOODWORKING

(Revised in 1955)

By Frykland and LeBerge

Completely new text for beginning students above 7th grade. New presentation — new typography — new illustrations — new organization — new projects.

- Covers fundamentals of hand woodworking
- Provides instruction on basic handtool operations
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- All about tools and how to use them, types of occupations, sources of wood, processing.

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Recently revised beginner's text includes 10 new units. Covers 90 operations. Numerous step-by-step photographs explain printing procedures, equipment, layout, design, history and occupational information. 198 pages, Cloth bound, $3.00

#8 GENERAL SHOP ELECTRICITY

(Recently revised)

By Dragoo and Porter

Beginner's text in practical electricity. Includes 26 practical projects to demonstrate applications of electrical theory with explanations of how and why each works. Projects include radio construction and usable home appliances. Many illustrations. $1.50

#13 GENERAL ELECTRICITY

(Revised 1954 edition)

By E. W. Jones

A text to meet the needs of young people for a practical working knowledge of common everyday electricity. Course includes 23 units. Simple and direct in presentation and well illustrated with drawings and photographs. Several shop projects of practical nature. 120 pages, $1.50

#43 APPLIED DRAWING AND DESIGN

By Mattingly and Scrogin

A comprehensive beginning text in many practical branches of drawing. Technicalities minimized making it adaptable for less talented as well as talented. Numerous problems. Profusely illustrated. 232 pages, $2.60

#30 GENERAL SHOP METALWORK

By Dragoo & Reed

Basic text for beginning metalwork. Covers sheet, ornamental, bench, art metal, casting. Includes many projects. 104 pages, $1.40

#60 Graphic
ARCHITECTURAL DRAFTING

(New — 1954)

By J. Edgar Ray

One hundred and ninety-four sketches and views graphically present the principles and techniques of architectural drawing. These are correlated with working drawings, plans, and detail drawings. 256 pages, $4.80

#2 MACHINE WOODWORKING

By Robt. E. Smith. Fundamental operations with power tools. Understandable instruction. 152 pages, $3.00

#55 TEACHING SUCCESSFULLY THE INDUSTRIAL ARTS AND VOCATIONAL SUBJECTS

By Silvius-Curry. Practical suggestions for successful shop teaching methods. 340 pages, $4.50

#75 GENERAL LEATHERCRAFT

(Completely revised 1955)

By Cherry. Designs and directions for 31 attractive projects. Detailed instruction for all operations. 356 illustrations. 144 pages, $1.50

#31 METALWORK TECHNOLOGY AND PRACTICE

By O. A. Ludwig. Complete book on general metalwork and allied trades. For text and reference use. 662 illustrations. 25-page index. $4.80

#49 STUDENT STUDY GUIDE

FOR METALWORK TECHNOLOGY AND PRACTICE

By Ludwig. Study, review, self-test sheets for units in the text. 120 pages. $1.25

#15 GENERAL DRAFTING

By Frykland-Kepler. Beginning text. Gives instruction on all basic principles and on drawing operations. 430 illustrations. 160 pages, $1.50

ADDITIONAL SHOP BOOKS

- **#36 GAS AND A.C. ARC WELDING AND CUTTING** (Revised August, 1956) *By Royalston F. Jennings.* 104 pages, $1.50
- **#80 ACTIVITIES IN CERAMICS — NEW** (Publication date, June, 1956) *By Vernon D. Seeley.* 82 pages, $1.50
- **#68 CONTEMPORARY INDUSTRIAL ART PROJECTS — NEW** (Publication date, May, 1956) *By Dezso Sekely.* 94 pages, $2.50
- **#32 MACHINE SHOP PROJECTS** *By Roy E. Knight.* 25 usable projects. $1.50
- **#9 PRINCIPLES OF ELECTRICITY** *By Wendell H. Cornetet.* 342 pages, $4.00
- **#28 INTRODUCTION TO APPLIED DRAWING** *By Hale, McGinnis and Hill.* 82 pages, $1.00
- **#14 BLUEPRINT READING AND SKETCHING** *By R. Paul Lightle.* 72 pages, $1.00
- **#17 BLUEPRINT READING, CHECKING and TESTING** (Revised August, 1956) *By Otto A. Steinike.* Part I, instructions and questions, $1.20. Part II, blueprints (#18) $1.20
- **#61 COMPOSING IN SPACE** *By Richard G. Wiggin.* 48 pages, $1.25
- **#27 SILK SCREEN PRINTING** *By James Eisenberg.* 159 illustrations. $1.50
- **#67 LINOLEUM BLOCK PRINTING** (New in 1955) *By Francis J. Kafka.* 84 pages, $1.50

You are cordially invited to stop in to visit our new home at Rt. 66 & Towanda Ave., Bloomington, Ill.

- **#50 HOME MECHANICS** *By J. C. Woodin.* 104 pages, $1.40
- **#22 DRAWING APTITUDE TEST** *By W. W. Mitchell.* Specimen set $0.35, 1-3 packages of 25, each $2.00, 4 or more packages, each $1.75.
- **#81 GENERAL BOOKBINDING** *By Chris Groneman.* 64 pages, $1.50
- **#33 MACHINING OF METAL** *By Robert E. Smith.* 224 pages, $3.60

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6. MASONRY SIMPLIFIED, VOL. 1 TOOLS, MATERIALS, PRACTICE: Dalzell-Townsend $5.40
7. METALLURGY: Johnson-Weeks..$5.50
8. RADIO-TELEVISION AND BASIC ELECTRONICS: Oldfield.....*$4.95*

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Chicago, Illinois

NEWS NOTES

(Continued from page 22A)

Registrations for the course are now being accepted by the Division of University Extension. The registration fee includes tuition, field trip to housing research activities, annual dinner, and several publications distributed as part of the course.

For further information write to the *Supervisor of Engineering Extension, Room 116d, Illini Hall, 725 South Wright St., Champaign, Ill.*

♦ The Office of Education, Washington, D. C., estimated recently that 2,957,227 students are taking credit courses in the nation's colleges and universities this fall. This exceeds last year's enrollment by 236,298, a gain of 8.7 per cent.

There were an estimated 735,065 new students this fall, compared with 689,635 new students a year ago. This is an increase of 6.6 per cent.

♦ Association Films, Inc., has moved to larger quarters in San Francisco. The new location is at 799 Stevenson Street. The move from their former San Francisco address was necessitated by the greatly increased number of film shipments in recent years, requiring greater storage space and larger shipping, inspection, and booking areas.

Association Films, a national distributor of sponsored free-loan films, educational and entertainment subjects and religious films, maintains three other regional film exchanges in: Ridgefield, N. J. (eastern area); La Grange, Ill. (midwest area); and Dallas, Tex. (southwest area).

♦ A flash photo contest for some eight million high school students has been announced by the General Electric Company's Photo Lamp Department.

Among the hundreds of prizes in General Electric's first "High School Flash Photo Contest" are trips, cash, and valuable merchandise. Total cash value of the 132 top prizes is about $7,500.

Closing date for the contest is January 15, 1957.

Human interest, not technical excellence, will be the most important quality of winning photographs, according to General Electric. Judges will choose winners on the basis of originality of approach to subject, the degree to which the photos tell a story, and their emotional appeal.

Entries for the High School Contest should be sent to *General Electric Company, Photo Lamp Department, P.O. Box 6837, Cleveland 1, Ohio.* Copies of the rules for the High School Contest may be obtained from the same address.

♦ A new publication, "Precision Finger Jointed Stock," has been released by the Western Pine Association, Yeon Building, Portland 4, Ore., for use in telling the story of finger jointed material to the consumer trade.

Of envelope enclosure size (3 by 6 in. when folded), it was designed for use by jobbers, wholesalers, lumber associations, and member mills to describe finger jointing to retailers, contractors, and other consumers throughout the nation. It is well illustrated and includes the recently adopted Western Pine Association finger jointing standard devised to assure consumers of jointed material given the same high quality care and machining as solid stock.

Copies of the folder may be obtained by writing for them.

Today's gasoline does 65 per cent more useful work per gallon in a modern high-compression engine than that of 1926 in *any* engine.

HERE ARE SOME OF THE NEW THINGS YOUR STUDENTS CAN MAKE WITH THESE AMAZING NEW PLASTICS!

For Example...PLASTIC PLANTS

They're Easy to Make — Lots of Fun, too, with VINOFLEX

the Remarkable New Liquid Vinyl Plastic that Produces Foliage so *Realistic and Life-Like*, its Hard to Tell It From Live, Growing Leaves when Viewed from Just a Few Feet Away!

Now — your students can make a wide variety of authentic-looking evergreen plants for decorating windows and planter boxes with the same material used to make dolls that look and feel so real. Vinoflex, newest marvel of the plastics world, is a syrup-like liquid that pours easily and forms a tough, resilient, rubbery material when exposed to oven heat from 300 to 325 deg. F. One of the unique features is that it can be used to make *internal* or *external* reproductions of a mold. Molds can be made of metal, glass, plaster — anything that withstands 325 degrees for a few minutes. Vinoflex foliages are Fireproof, Washable, Fade-Resistant, Droopless — can be cleansed with a damp cloth. Available in white, opaque, clear, light or dark green, red and yellow. Vinoflex comes in 8-oz., pint, quart and gallon sizes. It's ideal for making an endless variety of toys and novelties, too!

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We have them 0.002" and thicker. In rolls up to 6 ft. wide. Also make a perfect moisture barrier and mulch on strawberry plant beds.

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New Publications

Servicing TV AFC Systems

By John Russell, Jr. Paper, 128 pp., 5½ by 8½ in., illus., $2.70. John F. Rider Publisher, Inc., New York, N. Y.

Troubles in the AFC systems of TV receivers are difficult to diagnose and correct. This book discusses the trouble, location and repair of the major types of AFC circuits used today, as well as some of the less common AFC systems the technician may encounter. The theory, waveforms, components, common faults, and their diagnosis in these systems are presented in a manner that affords the reader a thorough understanding of AFC circuits and their behavior. Supplemented by more than 75 illustrations, it makes it easy for the technician to locate and correct troubles.

Easy Ways to Expert Woodworking

By Robert Scharff. Cloth, 185 pp., 6¾ by 10 in., illus., $3.95. McGraw-Hill Book Co., Inc., New York, N. Y.

This is a fine book on woodworking, giving expert directions on how to perform the various operations on the DeWalt "Power Shop" woodworking machine.

In its 185 pages the author has used over 300 photographs and line drawings to illustrate the use of this handy piece of woodworking machinery.

The 15 chapters introduce instruction for operating the radial-arm saw; special operations possible on this saw; dado-head operations; shaper-jointer operations; boring and routing; operation of the saber saw using the lathe, the disk, belt, and drum sander; grinding, buffing, and polishing.

The book also tells about shop safety, facts to be known about buying wood, woodworking techniques, wood-finishing facts, and how to make workbenches for the radial-arm machine.

The Art of Architecture

By Albert Richardson and Hector O. Corfiato. Cloth, 663 pp., $25. Philosophical Library, Inc., New York 16, N. Y.

This book traces the history of architectural design and construction through the remote past of Egypt, Greece, and Rome, through the Romanesque and Early Medieval periods, down to the Renaissance, and to contemporary architectural developments in Europe, America, and the Far East. The book is entirely concerned with the reasons for architectural phenomena, which it describes in the text, and illustrates in numerous drawings, plans, and photographic illustrations.

While the book is intended primarily for study in colleges of architecture, it is written in sufficiently popular style that it will hold the interest of any adult who has a desire to learn the basic reasons for the especial details of the historic styles and the beauties of architectural composition in the past. The author holds strongly to the doctrine that the art found in the architecture of any period reflects the spiritual character of that period to a greater degree than the prevalent literature, politics, social life, and even religious customs.

The drawings throughout are especially well made and well printed. The author has made a very successful effort to include some of the lesser known but thoroughly significant examples of early public buildings, castles, and palaces, churches, and domestic structures. American architecture is relatively well presented in the works of Sullivan and Wright of modern tall buildings, and a few examples of Colonial buildings. No finer account can be found of the continuity of the basic principles of art as exemplified in buildings than this story of our architecture.

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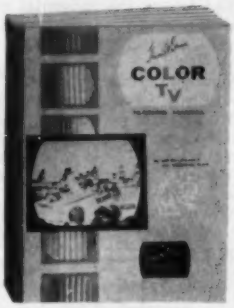

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"COLOR TV TRAINING MANUAL"

This comprehensive training course, written by Oliphant and Ray, clearly covers the entire subject of Color TV. Contents: **SECTION I:** Principles of the Color TV System (includes chapters on Colorimetry; Requirements of the Composite Signal; Make-up of the Color Picture Signal). **SECTION II:** Color Receiver Circuits (chapters on RF and IF Circuits; Video, Sync and Voltage Supply Circuits; Bandpass-Amplifier, Color-Sync and Color-Killer Circuits; Color Demodulation; Matrix and Output Circuits). **SECTION III:** Servicing the Color Receiver (chapters on Setting Up the Color Picture Tube; Aligning the Color Receiver; Trouble-Shooting; Test Equipment Required). Appendices include Equations, Vectors, Color-blocks, Colorplates, Glossary. A well-organized, effectively presented training course for advanced students in Electronics. 260 pages, 8½ x 11"; profusely illustrated. Order **TVC-1**, only..... **$6.95**

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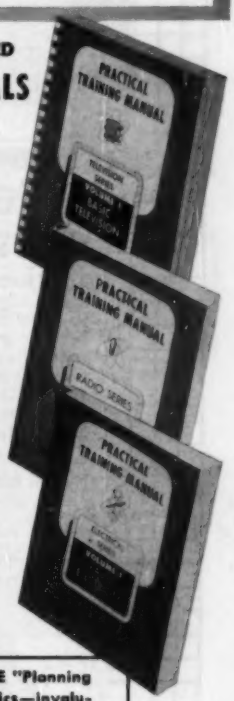

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Name_____ Title_____

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Business and Personal News

STARRETT COMPANY APPOINTMENTS

Douglas R. Starrett has been appointed executive vice-president of The L. S. Starrett Company, Athol, Mass.

After being graduated from high school, and while attending college, Mr. Starrett spent summer vacations in the plant. He began his service with the company as an apprentice toolmaker, and after serving in World War II as bomber pilot in the U. S. Eighth Air Force, returned to the company as methods engineer, followed by positions of chief methods engineer, assistant vice-president, and vice-president in charge of plant operations.

William J. Greene, vice-president and director of sales for the L. S. Starrett Company, retired on October 1, 1956, after 42 years of service with the company. In these years he has become widely known in the metalworking industry and among the industrial supply distributors and hardware dealers who distribute Starrett tools in this country and throughout the world.

Carl O. Newton, formerly general sales manager, succeeds Mr. Greene as vice-president in charge of sales. He joined The Starrett Company in 1929 and has served as New England salesman and New York branch manager prior to his appointment as general sales manager in 1952. He was elected as a director in 1955.

Cortland A. Bassett succeeds Mr. Newton as general sales manager. He has been associated with the company since 1946.

NEW SPARTAN MODEL 24

A DI-ACRO BOX AND PAN BRAKE

FORMS BOXES AND CHASSIS WITH UP TO ½" FLANGE

The Spartan's new design and rugged construction was planned specifically for school shops. Hardened Box Fingers are undercut to allow the forming of chassis and boxes as deep as 3" with lipped edges as large as ½" across. Material clearance of 1" between the Box Fingers and the Bottom Plate allows for easy insertion and removal of material. The Spartan bends 16 gauge mild steel up to 135° in one operation. It can also be used as a radius former and bar folder. An adjustable back gauge and a simplified stop control are standard equipment, *available in 24" width only.*

SPARTAN MODEL DI-ACRO ROLLER

Built exclusively for school shops in five widths, 12" to 36", all with 2" machined rolls. Form smooth cylinders with radii of 1" and larger in sheet metals up to 16 gauge. Heavy welded steel and cast construction.

DI-ACRO SHEAR

An industrial tool available to schools in 6", 9", 12" and 24" widths. Capacity 16 gauge steel.

DI-ACRO BENDER

Available in five sizes that form bar stock, flats and tubing in a minimum of change-over time.

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Name_____

School_____

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FRANK J. HODER, JR., RECEIVES APPOINTMENT

The Brown & Sharpe Manufacturing Company announced recently the appointment of Frank J. Hoder, Jr., as general manager of its soon to be formed Pump Division.

This position will combine engineering, manufacturing, and sales supervision of the company's gear, centrifugal, and vane pump activities.

Mr. Hoder was formerly Marketing Manager of the Government and Industrial Products Division of the Studebaker-Packard Corporation in Detroit. His previous industrial connections include general management positions with the Micro Precision Division of the Micromatic Hone Corporation, and the Marine Products Company, Detroit, Mich.

BLACK & DECKER TRAINING CLASS

Black & Decker Manufacturing Company, producers of portable electric tools, conducts a regular training program to acquaint its personnel with the company's policies and products. Each session takes two weeks.

Personnel from all over the world attend the training classes. Besides Mexico and Canada, representatives of the Black & Decker organization in Columbia, Denmark, Australia, and New Zealand have also participated recently, in addition to a number of representatives from the United States.

PLANNING TO MOVE

Eagle Pencil Company, a New York City landmark at 14th Street and Avenue C since 1877, will move their plant to Danbury, Conn. A tentative schedule calls for completion of a new plant in Danbury by 1960.

LIMA OPENS NEW BRANCH OFFICE

The Lima Electric Motor Company, Lima, Ohio, has opened a new branch office at 6432 Cass Ave., Detroit 2, Mich., to handle original equipment Lima Electric Motor and Lima Gearshift Drive Sales in the area.

The Detroit office is headed by Anthony N. Pellegrini, who is well known to manufacturers using industrial electric motors and selective speed drives.

NEW BRITISH DIRECTOR

The Black & Decker Manufacturing Company has appointed a managing director for their Harmondsworth, England subsidiary. He is Robert Appleby, who has served as Director of International Operations of the parent company. Mr. Appleby succeeds the late John V. Franklin, who died on October 7.

Mr. Appleby will retain his present position as Director of International Operations of the parent Black & Decker Manufacturing Company in Towson, Md., in which capacity he is responsible for all the Company's activities outside the United States and Canada.

IN CHARGE OF PUBLICITY

Carlton Shamo has joined the staff of the Dodge Manufacturing Corporation, Mishawaka, Ind., as supervisor of publicity, as announced by Ralph Hanes, director of advertising and sales promotion.

Mr. Shamo will develop and co-ordinate product publicity for various business and trade publications for the Dodge concern, manufacturers of power transmission equipment.

For the last 20 years, domestic oil production has increased an average of almost 5 per cent per year. — *Petroleum Newsnotes.*

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and "Pony" REG. U.S. PAT. OFF.

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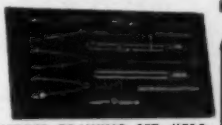

BERGER DRAWING SET #510 Complete — high-grade scholastic set; in velvet lined case. Price including complete kit — $11.00.

I-710A With interchangeable nickel silver master bow — $9.40.

Prices quoted are for quantities of 6 or more kits. Instructors may buy sample kit at same low price.

YOUR CHOICE OF 8 DIFFERENT TYPE DRAWING SETS — PLUS

Protractor	French Curve
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8" Triangle	2 Drawing Pencils
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New trunnion carries larger motors — to 2 H.P. Cuts 3¼" hardwood like butter! Fast SINGLE blade positioning control. Train of parts, trunnion to arbor, assembly-locked into one rigid part for a new high in precision at the cut! Up to 44% more ripping capacity, and 29% faster blade speed. Three power-packed V-belts. Accident-proof start-stop switch. Blade tilts left — adds safety for right-handed operators. New insert serves saw blades *and* dado heads, *without* interchange.

BOICE-CRANE 6-INCH ALL-STEEL LONG TABLE JOINTER

5-foot steel tables and 4-foot 2-lock fence. Does better work, with less effort or skill. Planes 12" wide. 8" model has 84" tables, 66" long fence. Wider infeed table makes rabbeting as easy and safe as jointing. Guard stays on machine — simply swings down when rabbeting. More accurate knife setting. Improved knife angle for beautiful blemish-free finish. Depth of cut, ⅛". Cutting arc dia. 3⅛".

BOICE-CRANE COMPANY
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Please send Big Free Boice-Crane Power Tool Catalog.
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Street.....
City & State.....

Descriptive Material

TWO MINIATURE CATALOGS

The Columbian Vise & Mfg. Co., have made available two new miniature catalogs descriptive of their complete vise and level lines.

The vise catalog features a cross section photo of Columbian Machinists' Vises which offer sledge-tested unbreakable castings. Other vise types described in detail, together with prices, are sheet-metal workers', chipping, combination pipe, hydraulic, hinged pipe, workshop, homeshop, woodworkers', woodcraft, and carpenters'. A special section is devoted to the new Columbian Gyro-Vise which operates upright or on either side. Vise accessories listed are hydraulic pumps, jaw caps, special jaw faces, bench anvils, and bench screws.

The level catalog shows five styles of aluminum levels of 18–24–28 inch lengths.

Magnesium levels, line and surface levels, pocket levels, torpedo levels, carpenters' and masons' wood levels and general purpose levels are also illustrated and described. Outstanding features include metallic-sealed vials that are reputed to increase level accuracy. These eliminate the conventional glass drawn tips that are said to be the greatest source of level failures.

Catalogs may be obtained upon request.

(For Convenience Circle Index Code 0112)

ALVIN TEMPLATE CATALOG

Available now is Alvin & Company's new, fully illustrated Alvin Template Catalog which displays and describes in detail all types of templates expressly manufactured and designed to meet the needs of engineers, architects, draftsmen, designers, artists, navigators, surveyors, and students. To further meet the needs of its customers, Alvin's Special Design Department employing design and production experts will create to exact specifications any template not listed in the catalog.

For your free catalog and/or "special" template, write on your company letterhead to Alvin & Company.

(For Convenience Circle Index Code 0113)

1957 ELECTRONICS CATALOG

Allied Radio Corporation announces the fall release of its new 1957 catalog — No. 160 — featuring an unusually large selection of radio, television, and electronic parts and equipment for use in schools, classrooms, laboratories, and shops. The 1957 edition of this electronics buying guide is the largest in the company's history — 356 pages listing over 27,000 items. Of great interest to teachers and other school personnel is the greatly expanded section on training kits, recording and test equipment, books, diagrams, parts and tubes, and other equipment required for radio and electronic training activities.

Many items of interest to schools, including the latest tape and disk recorders in all price ranges, and a complete selection of TV parts and accessories, are presented.

Catalog No. 160 is available by writing to the company.

(For Convenience Circle Index Code 0114)

WALL CHART ON REGAL LATHES

The R. K. LeBlond Machine Tool Company offers a new wall chart showing the construction and main parts of its new Regal Lathes. The two-color chart, which measures 35 by 45 in., is useful for teaching lathe terminology and construction to students. It is available for fifty cents by writing to the company.

(For Convenience Circle Index Code 0115)

DI-ACRO EQUIPMENT LITERATURE

O'Neil-Irwin Manufacturing Company have presented several pieces of literature describing Di-Acro Metalworking Equipment. The literature includes: (1) New Di-Acro Spartan Model Rollers, and Box and Pan Brakes designed especially for school shops; (2) New Package Deals on Di-Acro Equipment for school shops. If a shop is being equipped in the metalworking area, these package units offer a considerable saving over equipping a shop one piece at a time; (3) New Specification Sheet designed for quick easy reference when specifying Di-Acro Equipment.

Above pieces of literature are available from O'Neil-Irwin Manufacturing Company.

(For Convenience Circle Index Code 0116)

LEATHERCRAFT CATALOG

Tandy Leather Company presents their new catalog of kits and supplies for making genuine leather accessories. All of the kits are complete with instructions, and they are precision cut from genuine leather. Kits are available for the making of feather-light boots for relaxation, coin purses, key cases, billfolds, tobacco pouches, card cases, cigarette cases, eyeglass cases, coaster sets, link belts, contour belts, buckle sets, holsters, contours for slipper socks, beanies, scrapbooks, purses, carving and knife sets, shears, cutters and punches, and various other additional items for the use of the leatherworker.

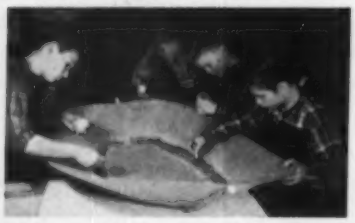
Catalog is available upon request.

(For Convenience Circle Index Code 0117)

CASTOGLAS PROJECT of the MONTH

The one-piece all-fiberglass hull of this sporty sailer was made by seventh grade seafarers.

WOULDN'T IT BE WONDERfull if the whole educational program could be elevated to the level of this exciting marine project? Every school day would be a holiday and every teacher would be an admiral in the eyes of his eager students. Building this 5½ foot sail boat or surf-



rider is sure a stimulating change after struggling with grammar, arithmetic and stuff . . . ask any boy.

A Fiberglass Project for the Wood Shop
Educational - Practical - Economical

Simplicity of design, easy-to-follow directions and the fact that only small hand tools are needed make this an ideal project for any wood or metal shop. No heat nor pressure is required. Cardboard serves as a mold in which the tough, lightweight, high-strength fiberglass hull is formed. The boat is leakproof. It won't swell in the water nor shrink in the hot sun. Requires no caulking nor painting; color of the desired shade is built right in as the pigment is mixed with the liquid Castoglas.

Important Industrial Application

While boat-building is a lot of fun, this happy fact does not diminish its great educational value. The basic technique of forming this hull is also employed by industry in constructing large corrosion and rot resistant water and oil tanks, prefabricated housing units and scores of similar products.

Students Pay For Boat Project

The boys will be more than eager to earn the money for a really worthwhile project that will give them a world of healthful pleasure all summer long. We'll be glad to tell you more about this boat . . . how it was made, what materials were used, how amazingly little it cost. Write to:

School Dept. A-50

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This C-7702 Art Table has a 20" x 24" metal edge, adjustable drawing top and a 10" x 20" metal edge reference top. Base and utility drawer are oak, finished golden oak or natural. You will find our prices attractive.

Drawing table C-7703B has a 30" x 32" solid basswood metal edge, adjustable top. Roomy drawers are individually keyed. Board compartment holds six boards 21" x 26". Base is oak, finished golden oak or natural. Let us quote prices.

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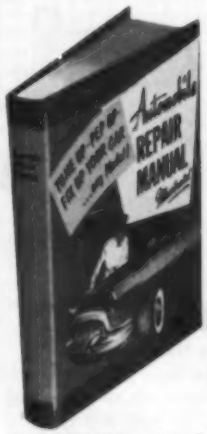
If it burns gas look to Johnson
Since 1901

Write for Free Johnson Catalog
plus information on factory reconditioning your present Johnson Furnaces

Look to the Leader



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Two valuable booklets covering classroom projects in Ceramics, Ceramics without a kiln, How to Make Molds, Wirecraft, Feltcraft, Woodcraft, Rusticraft, Planters, Patio Furniture Metalcraft, Metal Etching, Glass Etching, Casting with Liquid Plastics, Waxcraft, How to Make Beautiful Jewelry, How to Imbed Biological Speciments, Liquid Marble, Gemcraft Without Tools, Plastic Putty, Porcelizing, Laminating and many other subjects are available to teachers and school administrators. These booklets are *free of charge* if you will send us the name of the school and the subject or subjects most interested in.

PLASTICAST COMPANY
Dept. PC-613
6612 N. Clark Street Chicago 26, Ill.

Shop Equipment News

BOICE-CRANE SHAVING SHUTE

A new woodworking machine device in the form of an entirely new fence, known as the Shaving Shute, is being made available by Boice-Crane Company, concurrent with the offering of their new model spindle shaper.

Boice-Crane Shaving Shute

Unlike conventional fence design practice which leaves no place for shavings to go but up, the main body member of this rigid, massive new steel box weldment fence assembly is an effective chute for shavings, channeling them back and out, so as to eliminate a long prevailing hazard and nuisance. The operator's vision is unclouded by flying shavings and they do not pack around the cutter so as to choke the cutting speed.

Easy, inexpensive connection can be made to a unit-type or plant-wide shavings and dust collector.

The entire 27-in. fence as a unit, and each face independently, are adjustable fore and back. Hardwood faces are 2¼ in. high, each adjustable laterally to suit the cutter diameter.

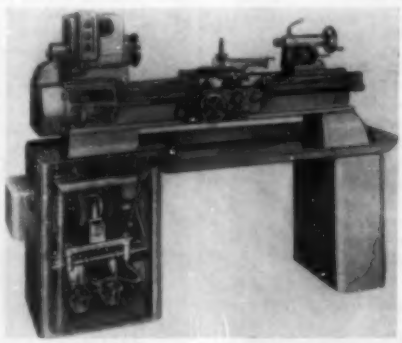
A free brochure will be sent to anyone upon request.

(For Convenience Circle Index Code 0101)

NEW SERIES OF SWING LATHES

The Sheldon Machine Co. Inc., have announced a new series of 11-in. and 13-in. swing lathes featuring heavy-duty speed drives.

These new lathes have higher spindle speeds to permit infinite selection of speeds from 40 to 1800 r.p.m. Speed changes are made visually and instantly by raising or lowering a T-handle speed selector lever. Actual spindle speeds are read on the large tachometer dial built into the headstock.



New Sheldon 13-in. Swing Lathe

Only 9 seconds are required to change from low to high speeds in either direct drive or back-gear. The spindle speed range is 200 r.p.m., to 1800 r.p.m., in direct drive and 40 r.p.m. in back-gear.

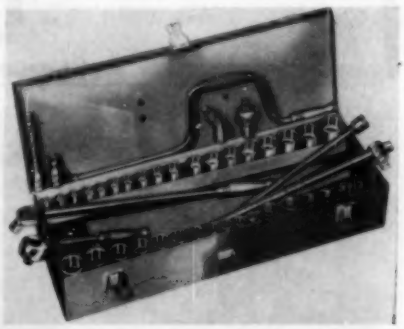
High horsepower is assured at all speeds by the oversize heavy-duty drive unit which takes a 2-h.p., 3-phase motor. Double V belts throughout the drive from the motor to the spindle deliver maximum gripping power.

Many other features are included in this new series. Further information is available upon request.

(For Convenience Circle Index Code 0102)

NEW SQUARE DRIVE SOCKET SET

Snap-on Tools Corporation have developed a new ½-in. square drive socket set with specially designed metal compartmented box. These tools are made of high quality alloy steel and have been especially heat treated for added strength. Sockets are thin walled for work in close quarters and have chrome plated finish.



New Square Drive Socket Set

The set includes eleven deep or bolt clearance type double hexagon sockets from ½ in. to 1⅛ in. wrench sizes by sixteenths; 18 standard double hexagon sockets from ½ in. to 1¼ in. wrench sizes by sixteenths; six single hexagon Flexockets with wrench openings of 9/16 in. to ⅞ in. by sixteenths; one 10-in. long ratchet handle; one ratchet adaptor; one 18-in. long nut spinner; one 15-in. long sliding T handle; one universal joint; one 19½-in. long speeder; and three extension bars, 2 in., 5 in., and 10 in. long.

Further information is available.

(For Convenience Circle Index Code 0103)

BOY-PROOF DRAWING TABLE AND TOOL CABINET

Two virtually boy-proof products for vocational training shops — a drawing table and a tool cabinet — have been developed by the Standard Pressed Steel Company.

SPS design engineers term the drawing table and tool cabinet virtually boy-proof. The equipment, developed after intensive study of the needs of the vocational and industrial-arts training shop, is designed and built, they say, to resist and minimize damage by student neglect or mischief.

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- Requires no brushes
- Protects and preserves wood
- Needs no sanding between coats

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There's a Crow Electri-Kit designed specifically for either teacher or student use in:

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Rotating Electrical Machinery
Electro-Dynamics

For detailed bulletins write

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Division of Universal Scientific Co., Inc.
Box 336G • Vincennes, Indiana

Boy-Proof Shop Drawing Unit

The sleek-limbed drawing table consists of a laminated 1¼-in. wood-top set at a fixed angle on a base of heavy-gauge satin finished aluminum tubing. Ingenious joints between the legs and the cross braces add to the clean, functional appearance of the table while insuring maximum rigidity without unnecessary bulk.

The fixed position top, set at a scientifically determined height and angle, eliminates loss or damage to movable parts and reduces commotion in the classroom. A single drawer slide, but no drawer, is installed under the working surface of the table.

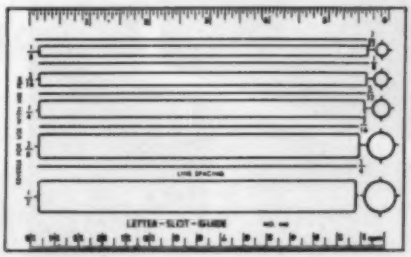
Similarly, drawing boards are stored between classes in the accessory cabinet which will accommodate 12 boards of any size up to 18 by 24 inches. Normally, this cabinet would be kept locked by the instructor.

Further information is available upon request.

(For Convenience Circle Index Code 0104)

LETTERING-SLOT-GUIDE TEMPLATE

Alvin & Company has announced a new convenient lettering-slot-guide template made of .060-in. thick acrylic material which is durable, shatter-proof, and transparent.



Lettering-Slot-Guide Template

The Alvin lettering-slot-guide template is cut in five guide slots in the popularly needed sizes of ⅛ in., 5/16 in., ¼ in., ⅜ in., and ½ in. Five circles in these same sizes have also been incorporated. In addition, the top of the template is a 6-in. ruler in 16ths and the bottom a 6-in. ruler in millimeters.

Compact and handy (over-all size 4 ⅛ by 6¾ in.), this Alvin lettering-slot-guide template is designed to save eyesight and give an unlimited choice of lettering or numbering in slant, broad or narrow characters wherever uniform capitals or lower case letters are required.

More information is available upon request.

(For Convenience Circle Index Code 0105)

NEW PROTECTIVE GOGGLES

General Scientific Equipment Company are offering a featherweight plastic goggle for

(Continued on next page)

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ASK FOR LITERATURE

Western Materials Company
Equipment Division
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Chicago 3, Illinois

SHOP EQUIPMENT NEWS

(Continued from previous page)

New Protective Goggles

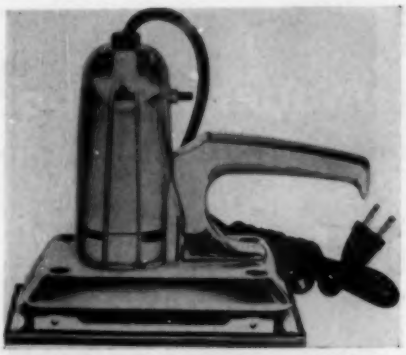
eye protection. They are suitable for wearing over prescription glasses, and fit like eyeglasses with the exception that they are roomier and stand off farther from the face, thus allowing greater circulation. One-piece lens offers full vision, available in clear or medium green.

For further information write to the manufacturers.

(For Convenience Circle Index Code 0106)

NEW MODEL SANDER

Portable Electric Tools, Inc., have designed the Model 280 Shopmate Oscillating Sander to handle any home workshop operations that require coarse, medium, or fine sanding. This unit works equally well for finishing, polishing and rubbing on metal, plastics, composition materials, wood, etc. The housing of this 3/16-in. oscillating sander is made of durable die cast aluminum. The housing permits the operator to have a clear, unobstructed view of the front of the pad for "feather edging" and corner sanding.



Model 280 Shopmate Oscillating Sander

A powerful Universal a.c./d.c. motor provides the power giving 3500 orbits per minute. The abrasive paper is attached to the sanding pad by a positive locking knurled roller mechanism, providing a rapid means of attaching paper. The sanding area is 7¼ by 3⅝ in., and uses ⅛ of a standard sheet of sandpaper. The pad is made of ¼-in. closed-cell constructed rubber, resistant to grease and water.

(For Convenience Circle Index Code 0107)

LIGHT COMPACT ELECTRIC SAW

Porter-Cable Machine Company have introduced a heavy duty 6½-in. portable electric saw for builders, carpenters, and the woodworking industry. It meets the performance and durability requirements of the professional user.

Heavy Duty Portable Electric Saw

The new Model 146 weighs only eleven pounds. A 1½-h.p. motor drives its 6½-in. blade at 3670 r.p.m., under load for high cutting performance. It easily cuts dressed 2 by 4's at 45 deg. An exclusive calibrated depth gauge, adjustable from a minimum depth of 1/32 in. to a maximum of 2 3/32 in., eliminates any guesswork on the depth of cut.

Equipped with 6-in. abrasive blades, the 146 will cut compositions, ferrous and nonferrous metals, stone, plastics, and other problem materials. The new saw may be converted into a precision table saw by mounting it beneath the Porter-Cable Model 5010 Saw Table with the blade protruding and using the telescopic guard, depth and bevel adjustments.

For further information on the numerous additional features of this saw, write to the manufacturers.

(For Convenience Circle Index Code 0108)

(Continued on page 34A)

B·G's New SD-4 Drawer Type 4-Station Bench

Using the same quality hard maple top (54" x 64" x 2¼") as the famous L-4 and DD4, we have provided a new type base consisting of two 4-drawer sections — 8 drawers in all. This unit thereby gives the flexibility that many shops desire. Constructed of heavy 16 gauge metal, each drawer has a positive stop, and is finished in olive green. Write for prices and further information.

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Top: 54"x64"x2¼" hard maple.
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Write for Bulletin LF-108 and for Special Literature on Marking—for use in Industrial Arts Instruction.

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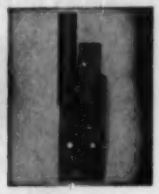

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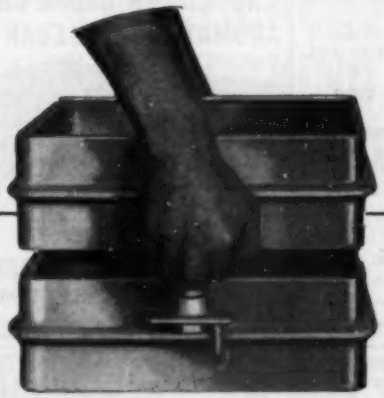

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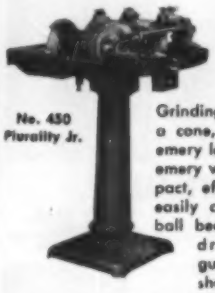

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SHOP EQUIPMENT NEWS

(Continued from page 32A)

COMPLETE APPRENTICE TOOL CHEST

Brown & Sharpe Mfg. Co., has created and introduced a complete Apprentice Tool Chest with high quality precision tools selected to meet the requirements of the average apprentice in the metalworking trades.

Complete Apprentice Tool Chest

This manufacturer is well suited to furnish such an apprentice chest, since the company has made the highest quality tools for over one hundred years and has also conducted its world reknown apprenticeship courses throughout that period.

The chest is of durable oak, with drawers of several depths and widths to accommodate the original set of 21 precision tools, plus ample room for additional tools purchased later.

A registration card furnished with the chest may be mailed to Brown & Sharpe by the owner to secure a free personalized, engraved, chrome name plate to be attached to the chest for identification.

The new Apprentice Tool Chest is available through Brown & Sharpe distributors and dealers.

(For Convenience Circle Index Code 0109)

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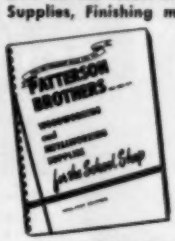

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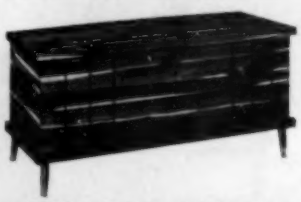

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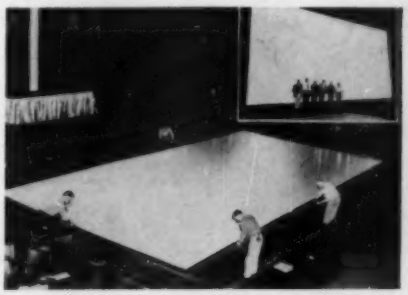
PORTABLE PROJECTION SCREEN

Radiant Manufacturing Corporation, a subsidiary of United States Hoffman Machinery Corporation, are the producers of the world's largest Radiant Projection Screen pictured here.



Portable Projection Screen

It is constructed of Radiant's latest Superama *Invisible-Seam* flame-proof fabric and its lightweight aluminum frame were assembled ready-for-showing in less than two hours. It is 20 by 40 ft. in size and fits easily into a crate just 144 inches long permitting low-cost transportation wherever needed.

Further information is available upon request.

(For Convenience Circle Index Code 0110)

NEW POLISHING KIT

Cratex Manufacturing Company have developed a New Polishing Kit containing 24 of the most popular Cratex Polishing Wheels,

(Continued on next page)

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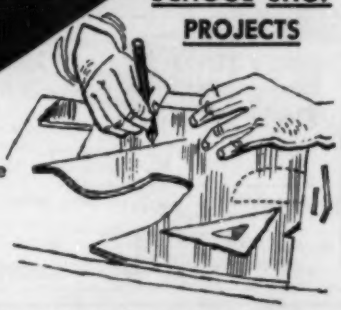

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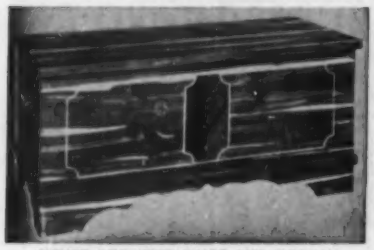

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SHOP EQUIPMENT NEWS

(Continued from previous page)

Cratex New Polishing Kit

Cones, Blocks, and Mandrels. The kit offers a wide use for every manufacturer to test Cratex rubberized abrasives on deburring, smoothing, and polishing operations, on production and assembly lines, in finishing operations, in tool and machine shops, in repairs and maintenance. A few specific uses are cleaning and polishing dies, molds and castings, blending in and polishing welded seams after rough grinding, polishing bearing surfaces and raceways, cleaning and polishing commutators and contact points and removing rust, heat marks, tarnish, excess solder, scratches, and corrosion.

A complete bulletin giving full details of the polishing kit and application instructions is available from the manufacturer.

(For Convenience Circle Index Code 0111)

The American motorist in one year consumes enough gasoline to fill a 29½-inch pipe line stretching from here to the moon. — *Petroleum Newsnotes.*

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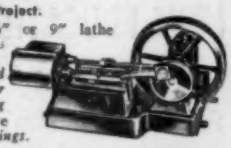

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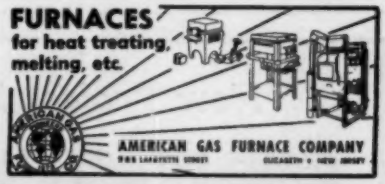

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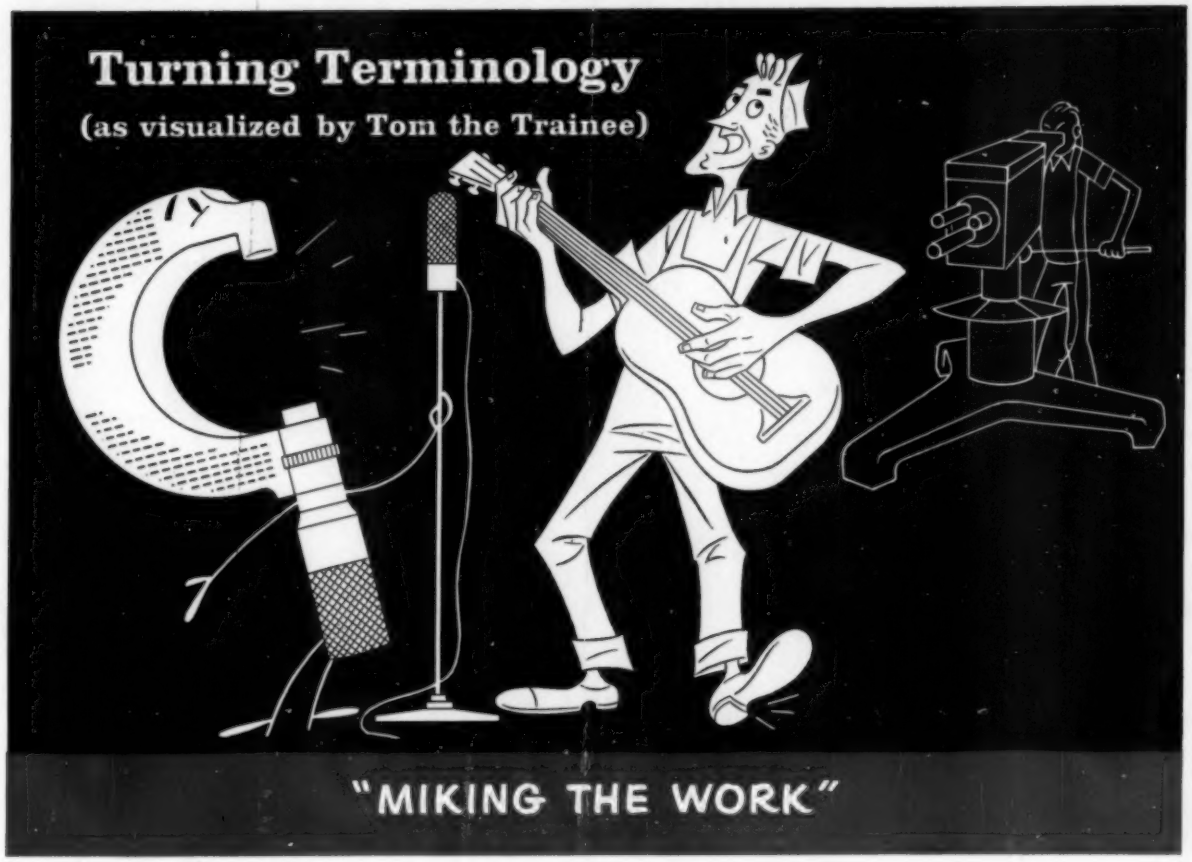

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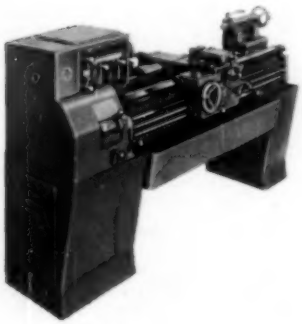

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